



Annual Report 2011

National Neonatal Audit Programme

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Funded by the Healthcare Quality Improvement Partnership

Royal College of Paediatrics and Child Health,
National Neonatal Audit Programme Project Board

Neonatal Data Analysis Unit (NDAU),
Imperial College, London

RCPCH
Royal College of
Paediatrics and Child Health
Leading the way in Children's Health

Annual Report

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Explanatory note

In this report, the electronic platforms hosted by Clevermed Ltd are all referred to as the “BadgerNet”.

1. Introduction

Welcome to this fifth annual NNAP report covering the calendar year of 2011.

This paper-based report is a briefer version of that found on the NNAP website www.rcpch.ac.uk/nnap. The on-line report contains additional more detailed tables, graphs and analyses. The symbol  indicates that further analyses are available on line.

This year's report includes data from 95.9% (164/171) of English neonatal units operational in 2011. All English neonatal units are contributing data to the NNAP in 2012.

Key messages

- The percentage of eligible mothers receiving antenatal steroids has risen for the last 4 years and reached 76% in 2011.
- 90% of babies $\leq 28^{+6}$ weeks gestation had their temperature taken within an hour of birth. Of those 46% were hypothermic (temperature $< 36.5^{\circ}\text{C}$).
- The percentage of eligible babies screened for ROP has risen annually for the last 5 years to 82% in 2011 and the percentage being screened on time has risen for the last 3 years to 67%.
- 54% of babies < 33 weeks gestation are discharged home taking their mother's milk.
- The proportion of parents seen within 24 hours of their baby's NNU admission has risen from one third to two thirds in 5 years.
- 60 (36%) of the 164 units contributing data to the audit failed to provide birth denominator data in time for inclusion in the report. This results in those units automatically failing two of the audit questions.
- Only 15% of babies were recorded as having had a blood culture performed. Under-recording of data is a major issue for the first year this question has been audited.
- 29% of babies did not have a record of their level of consciousness during the first three days of life. The calculated average rate of grade 3 HIE of 5 per 10,000 births for those units that contributed birth denominator data therefore represents a minimum figure.
- No two year corrected age health status data was recorded for 55% of babies < 30 weeks gestation. Incomplete data recording, particularly in the two year follow up, may give a false picture of the outcomes of neonatal care.

1.1 Background

The National Neonatal Audit Programme (NNAP) is funded by the Department of Health through the Healthcare Quality Improvement Partnership (HQIP). It is delivered by the RCPCH Research and Policy Department. The audit commenced with the collection of data from neonatal units in 2006 and was rolled out throughout England in 2007.

This fifth Annual Report relates to babies discharged from neonatal units in England between 1 January 2011 and 31 December 2011.

1.2 Aims of the audit

The key aims of the audit are:

- i. To assess whether babies admitted to neonatal units in England receive consistent care across England in relation to the audit questions; and
- ii. To identify areas for improvement in neonatal units in relation to delivery and outcomes of care.

1.3 What is a neonatal unit?

NNAP is centred on the outcomes and care of babies admitted to neonatal units (NNUs). Data utilised by the NNAP are entered by NHS Trusts in different ways. Some Trusts include babies cared for in “transitional care” wards; some but not all enter data for babies admitted to a neonatal unit for only a brief stay; some include babies receiving care by neonatal unit staff even though the baby remains by his or her mother’s side on a postnatal ward. This inconsistency in the way data is entered has in turn generated the question “What is a neonatal unit”? The answer to this question has been affected by:

- i. the costs of including babies within such a database, and in some Trusts this has meant that babies receiving special care (such as IV antibiotics) on the postnatal wards adjacent to their mothers have not been included in these databases.
- ii. the attitude of local commissioners over funding the sort of special care described above or funding only special care “within the 4 walls of a NNU”. This variability has in turn led to large differences in the percentages of babies “admitted to NNUs” across the country with, for example, both Bristol NNUs admitting some 2,400 babies annually and other large regional units admitting around 1,000 babies annually, but some as few as 500 babies. A major factor determining this variation is the number of babies “admitted” for special care.

At the combined NNAP/NDAU meeting in January 2012 colleagues from a number of NNUs queried previous NNAP analyses in which all NNU database admissions had been analysed for question 5 (consultation by a senior member of the neonatal team within 24 hours of admission) and question 7 (babies born between 32⁺⁰ to 36⁺⁶ and >37⁺⁰ weeks gestation receiving care on a

neonatal unit). They pointed out that those units recording large numbers of special care admissions were probably reporting large numbers of babies in transitional care units or on the postnatal wards: these babies' parents did not necessarily need be seen by *senior* staff members within 24 hours of admission. Thus, a level 3 unit with a low number of special care admissions could reasonably be expected to have a very high percentage of parents seen within 24 hours, but one with 1,000 or more special care admissions would not achieve such a high percentage and the two should not be compared as being similar.

Although the merits of this point (i.e. that there is less urgency for senior staff to see parents on transitional care or post-natal wards) can be debated, NNAP has this year changed its approach to the analysis of these questions. It has tried to confine it to those babies admitted into what could be physically recognised as a NNU. From the data available the most reliable way to do this has been first to select only babies in HRG groups 1, 2 and 3 which correspond essentially to intensive care, high dependency care and special care*. Babies in groups HRG 4 have their mother resident and caring for them and are therefore receiving either transitional care or are on the postnatal ward with their mothers. Babies in HRG 5 are receiving normal care. Therefore in the NDAU analyses some sections indicate that only data from babies who were in HRG 1, 2 or 3 on specific days of their lives have been used. This left a single outlying unit that still had over 2000 admissions and therefore a further filter was applied of 'location of care = NICU' which excluded small numbers of babies in any unit where this field had not been completed or where infants were marked as being cared for in 'Transitional care' or within a 'Postnatal ward'. This filtering should enable a more like-with-like comparison between the units despite the variations in admission policies and data collections. Comments on the new analysis will be welcome.

*Information related to neonatal HRGs for 2011/2012 can be found on the Information Centre website - <http://www.ic.nhs.uk/services/the-casemix-service/using-this-service/reference/archived--past-groupers-and-documentation/payment/hrg4-2011-12-local-payment-grouper-documentation>)

2. Methodology

2.1 Audit questions

The questions posed in the audit in 2011 were:

1. Do all babies of $\leq 28^{+6}$ weeks gestation have their temperature taken within the 1st hour after birth?
2. Are all mothers who deliver their babies between 24^{+0} and 34^{+6} weeks gestation given any dose of antenatal steroids?
3. Do all babies $< 1501\text{g}$ or gestational age at birth $< 32^{+0}$ weeks and still an inpatient undergo 1st ROP screening in accordance with the current guideline recommendations?
4. What proportion of babies $< 33^{+0}$ weeks gestation at birth are receiving their mother's milk when discharged from a neonatal unit?
5. Is there a documented consultation with parents/carers by a senior member of the neonatal team within 24 hours of admission?
6. Are all babies accessing neonatal services treated in their own normal network clinical pathway (except where clinical reasons dictate)?
7. How many babies, born between 32^{+0} to 36^{+6} and $\geq 37^{+0}$ weeks gestation, receive care on neonatal units?
8. Are rates of normal survival at two years comparable in similar babies from similar neonatal units?
9. What percentage of babies admitted to a neonatal unit have:
 - One or more episodes of a pure growth of a pathogen from blood
 - one or more episodes of a pure growth of a pathogen from CSF
 - either a pure growth of a skin commensal or a mixed growth with ≥ 3 clinical signs at the time of blood sampling?
10. What percentage of babies of more than or equal to 35^{+0} weeks gestation have an encephalopathy within the first 3 calendar days of birth?

These questions are addressed by the data items listed at Appendix B.

2.2 Participating units

There were 171 neonatal units in England in 2011; 95.9% (164) of these contributed data for the NNAP 2011 analysis in this report (unit levels 1, 2 and 3; Appendix C provides definitions of the different categories of care); 163 unit data submissions are included in this report. The results for James Cook University Hospital, Middlesbrough, include those of Friarage Hospital as these units submit one combined set of data for South Tees Hospitals NHS Trust and the Leeds Neonatal Service covers both Leeds General and St James's Hospitals. Participating units are listed at Appendix D.

Data was submitted by all these units to the BadgerNet system. 26 units were submitting NNAP data to another system, The Neonatal Survey (TNS), during 2011. In 22 cases, these units were submitting data to both BadgerNet and TNS. The NNAP Project Board took the decision to exclude the data from TNS from this report because of problems in data quality which arose from the amalgamation of the 2010 NNAP data from these two systems. This has meant that four neonatal units which were participating in NNAP in 2011 are not represented in this report (Leicester General, Leicester Royal Infirmary, Northampton General Hospital and York District Hospital). These units are all moving to utilise the BadgerNet platform in 2012 and will therefore be included in future NNAP annual reports.

The 2011 data received by NDAU for Liverpool Women's Hospital were incomplete. The hospital requested that these data be withdrawn and is working with NDAU/NNAP to ensure that these issues are resolved.

One neonatal unit started to use the BadgerNet platform part way through 2011 (Queen's Hospital, Burton on Trent) and they are thus represented in this report by less than a full calendar year's data; in addition, four neonatal units (Queen Elizabeth II Hospital Welwyn, Maidstone General Hospital, Rochdale Infirmary and Salford Royal Hospital) closed during 2011. All units with less than twelve months data are identified in Appendix D.

Table 1. Neonatal units in England without data included in this report:

Neonatal unit	Reason NNAP data not submitted
Cumberland Infirmary WestCumberland Hospital	These units were not using any central data collection system in 2011; both will start using BadgerNet in 2012
Leicester General Leicester Royal Infirmary York District Hospital	Submitting data to TNS system only in 2011; using BadgerNet from January 2012
Northampton General Hospital	Submitting data to TNS system only in 2011, using BadgerNet from March 2012
Liverpool Women's Hospital	Incomplete data received by NDAU

2.3 Data quality and completeness

Quarterly data quality reports were produced by the Project Team for the first three quarters of 2011 to provide feed back to units on data completeness on seven audit questions. These reports encouraged correction or completion of data prior to the data download for the annual report analysis.

2.4 Data analysis

This fifth Annual Report presents the audit outcomes for babies with a final discharge from neonatal care between 1 January 2011 and 31 December 2011.

NNAP data entered by neonatal units on the BadgerNet are anonymised (to remove patient identifiers) by Clevermed and submitted to NDAU, who are commissioned by NNAP to undertake data management and analysis.

The 2011 download included 78,934 completed episodes involving 68,192 babies discharged in 2011. The number of babies eligible for each audit question varies depending on the gestational age and the episode of care under consideration. In addition, numerators may vary from local or network figures for data handling reasons; for example, in the analysis of Question 5, some babies born, first admitted and discharged in 2011 may not appear in the analysis because the baby had a subsequent episode which continued into 2012. By the same reasoning, there are some episodes which finished during 2010 that were used for the 2011 analysis.

2.5 Denominator data

Perinatal denominator data are required from Trusts to enable audit question 7 (“How many babies born between 32⁺⁰ and 36⁺⁶ weeks and $\geq 37^{+0}$ weeks gestation receive care on a neonatal unit?”) and question 10 (“What percentage of babies more than or equal to 35⁺⁰ weeks gestation have an encephalopathy within the first 3 calendar days of birth?”) to be answered. Prior to 2010, the NNAP obtained this data using a form shared with the body responsible for the collection of perinatal data nationally. The contract for this work has now been retendered, but there has been a delay in transitioning to the new supplier. Therefore, the 2011 denominator data were requested directly from Trusts by the NNAP through our Neonatal Unit and Midwifery contacts.

137 Trusts representing 164 neonatal units were contacted, and 88 Trust returns (representing 104 units, 63.4%) were received by the deadline date of 16 March 2012. Thank you to the neonatal units who responded promptly to NNAP’s own request for these data.

A prompt response to requests for this information is needed in order to comply with this audit. In the future, failure to respond promptly to this data request, either from NNAP or another organisation working with NNAP, will result in non-participation in these two audit questions and be reported back to the Trust (it will not be reported as such this year). It is entirely predictable that these birth data will be requested on an annual basis and units should be ready to respond; at least six weeks will be allowed for this.

3. Results

Question 1

Audit: Do all babies $\leq 28^{+6}$ weeks gestation have their temperature taken within the 1st hour after birth?

Standard: 98 – 100% Temperature taken within an hour of birth

For temperatures taken within an hour of birth:

90% at 36.6°C to 37.5°C

10% at 36.0°C to 36.5°C

Source of Standard: NNAP Board

Results:

There were 2792 babies born at a gestational age of $\leq 28^{+6}$ weeks reported by **164** neonatal units (eligible babies); **6** of these infants were excluded because their temperature value was outside the recordable range, leaving **2786** infants eligible for the question. Of these, **90%** (2507/2786) of the babies had their temperature measured within the first hour following birth (Table 1.1). Missing data, where either temperature or time was not recorded, or the time of recording was equal to the time of birth, accounted for **8%** (219/2786) of eligible babies. The first temperature measurement was between 36.0°C and 37.4°C for **71%** (1784/2507) of the babies who had their temperature measured within an hour of birth.

Table 1.1

Babies born at a gestational age of $\leq 28^{+6}$ weeks with their temperature taken within the first hour of birth. Infants are assigned to their place of birth

Unit level	Eligible babies	Time temperature was measured (from birth)		
		Within an hour	After an hour	Missing data
Other*	24	21 (88%)	.	3
1	154	134 (87%)	1	19
2	921	819 (89%)	19	83
3	1687	1533 (91%)	40	114
Total	2786	2507 (90%)	60	219

NNAP, 1st January - 31st December 2011

**Babies are assigned to the hospital of birth or 'Other' if born at home, in transit, in an unknown location or in a non NNAP unit.*

Table 1.2

Five year trend in temperature after birth

Year	Eligible babies	Percentage with temperature taken within an hour
2007	950	61%
2008	2647	78%
2009	3230	63%
2010	3380	83%
2011	2786	90%

Although there appears to be an improvement in the percentage of babies whose temperature is taken within an hour of birth in 2011, there is no consistent trend. The rising numbers reflect recruitment of units into NNAP, with a slight reduction in 2011 with the loss of some TNS-only units (see section 2.2).

The cumulative distribution of babies by time of first temperature measurement is available in the web-based report. [🔗](#)

Figure 1.1

Funnel plot comparing unit results in the 'temperature taken within an hour of birth' standard

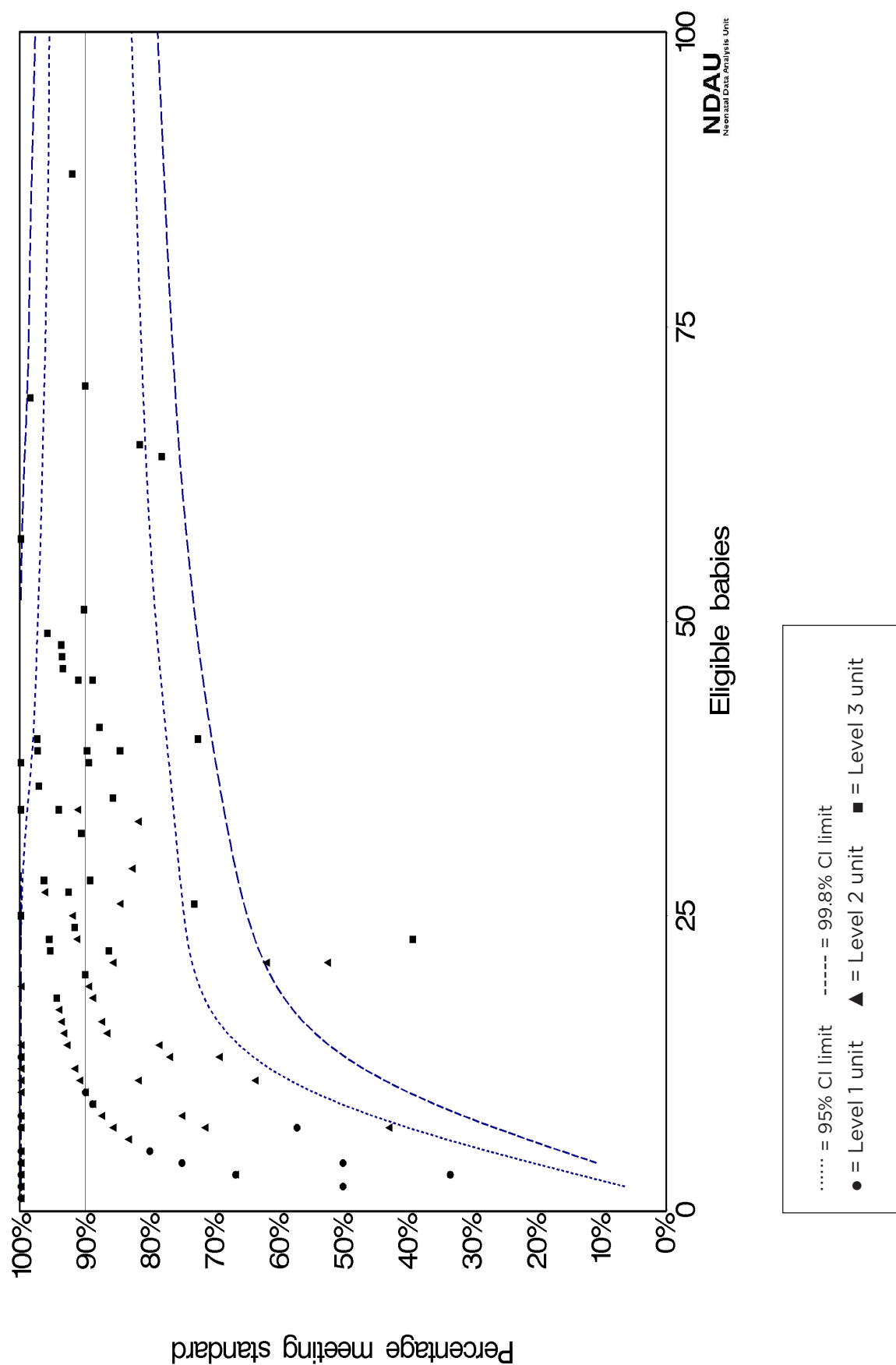
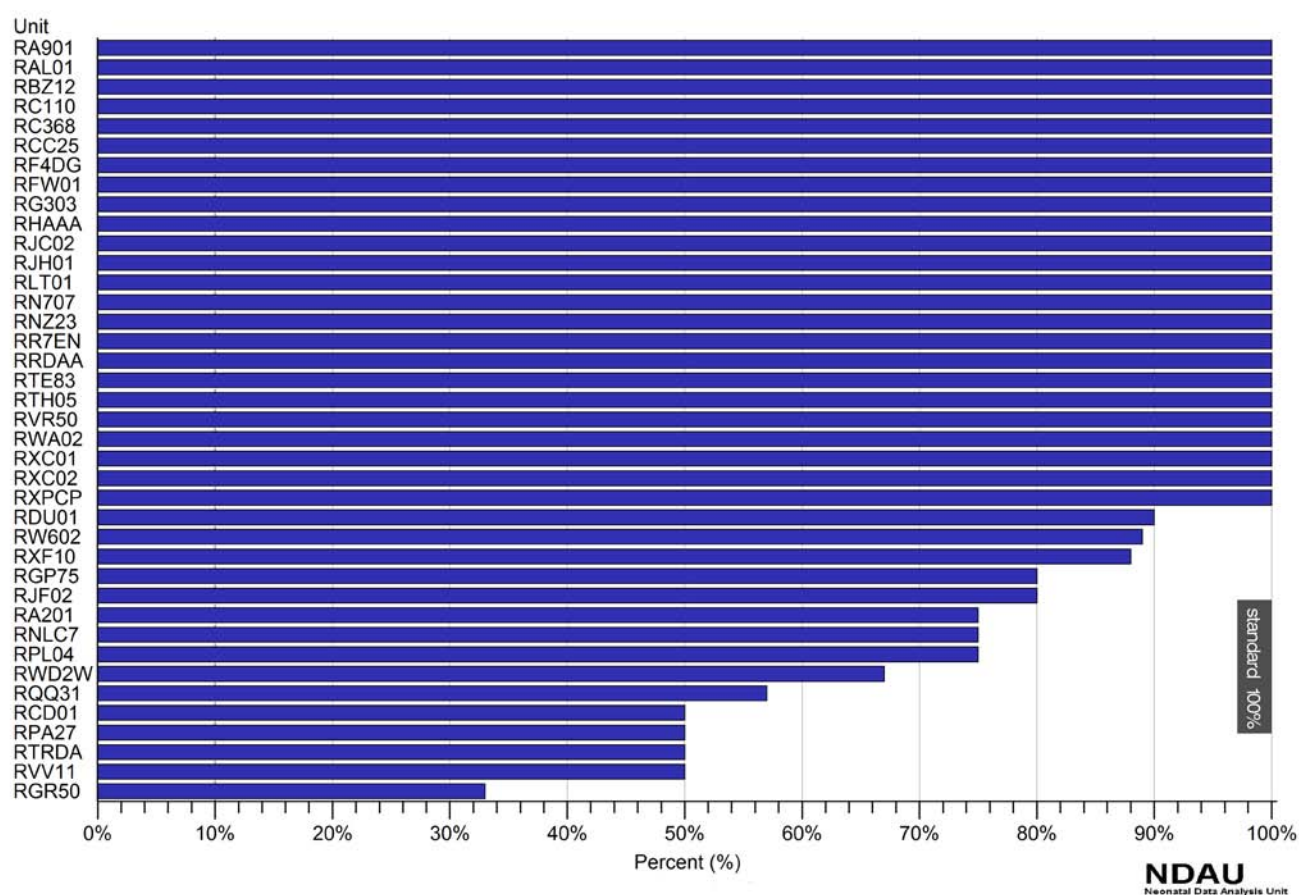


Figure 1.2.1

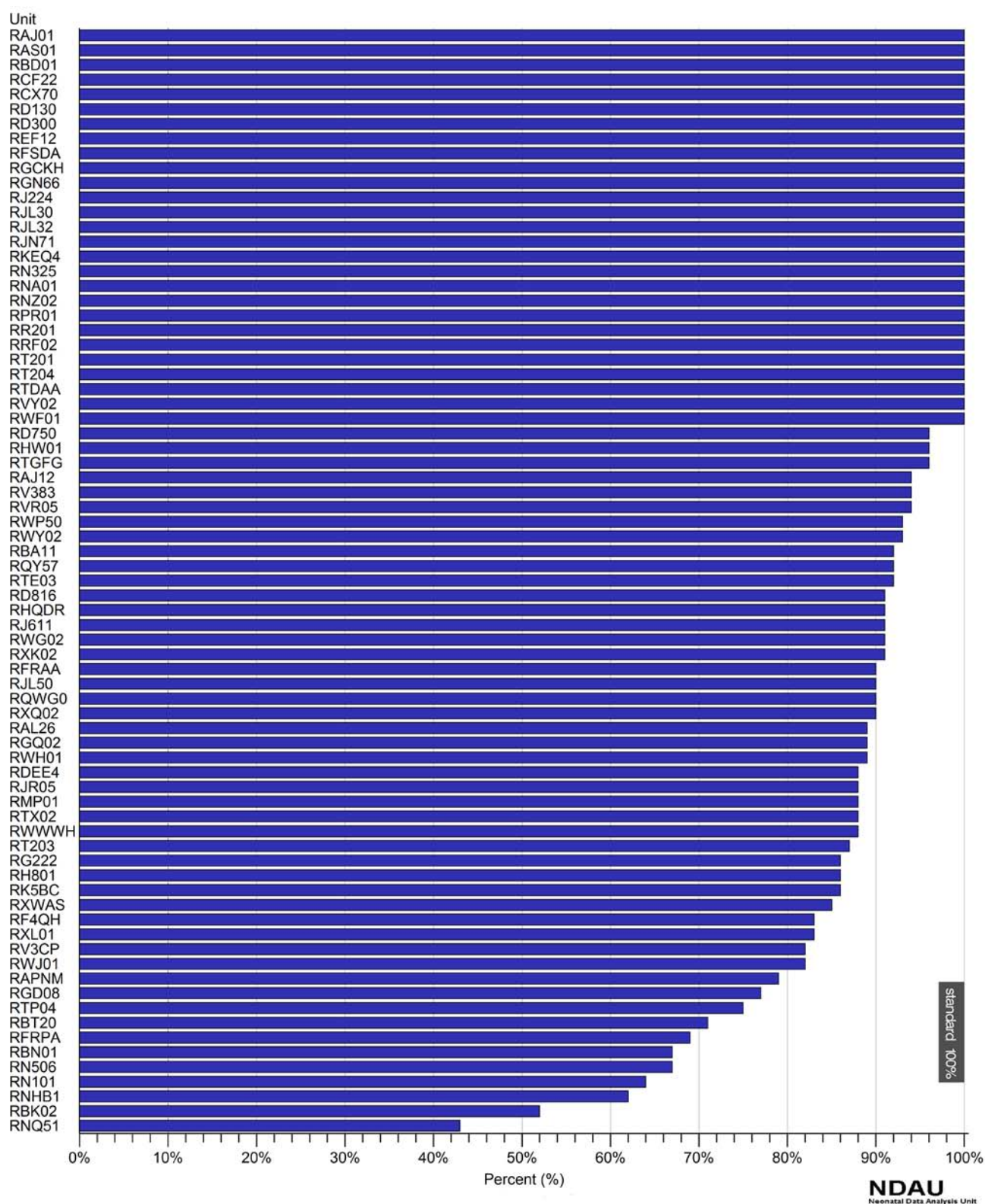
The proportion of eligible babies who had their temperature taken within the first hour of birth for individual neonatal units: **Level 1**



NNAP, 1st January - 31st December 2011

Figure 1.2.2

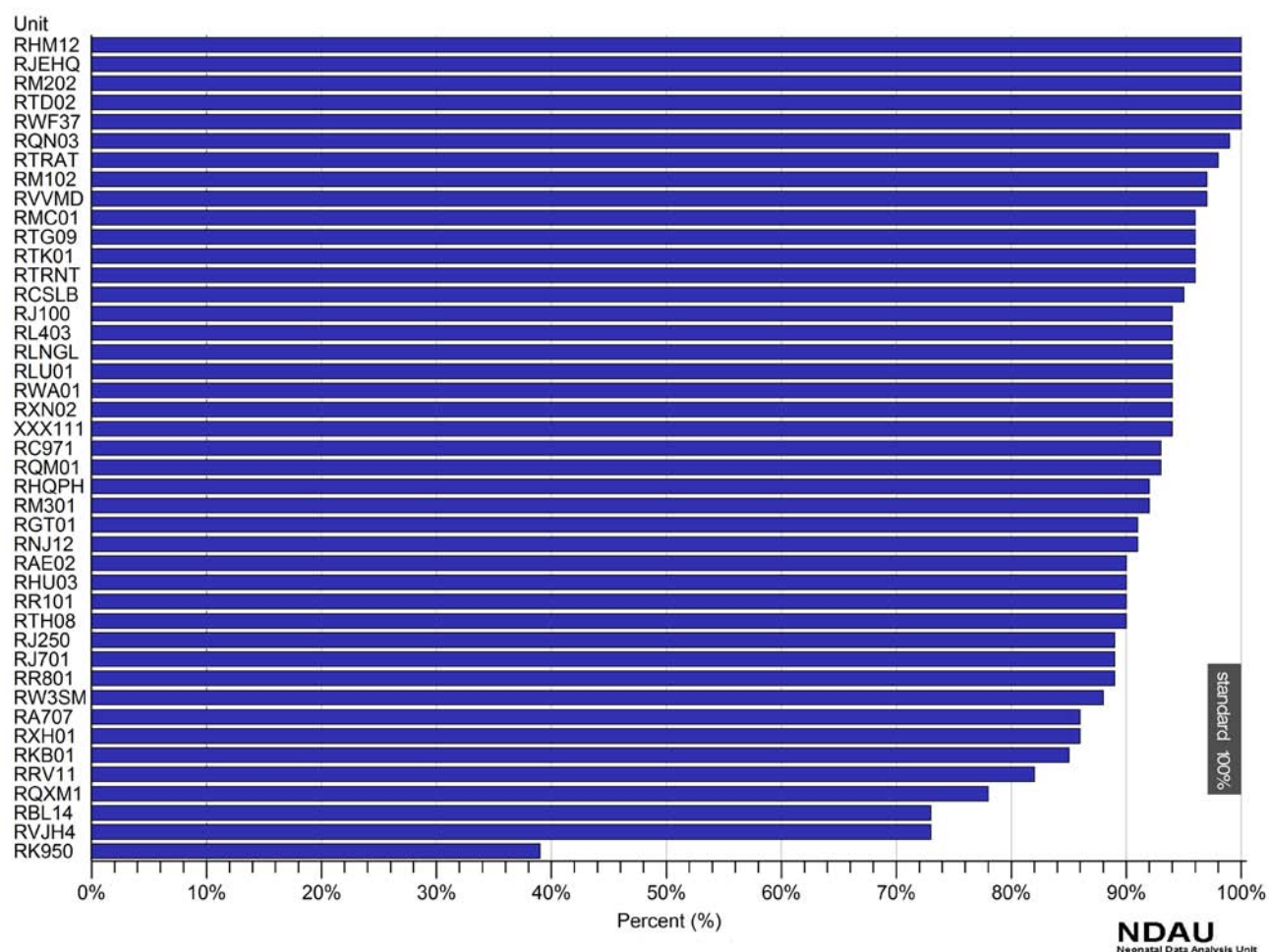
The proportion of eligible babies who had their temperature taken within the first hour of birth for individual neonatal units: **Level 2**



NNAP, 1st January - 31st December 2011

Figure 1.2.3

The proportion of eligible babies who had their temperature taken within the first hour of birth for individual neonatal units: **Level 3**



NNAP, 1st January - 31st December 2011

The number of eligible babies for each unit included in these and the other graphs in this report are available on line. [🔗](#)

Table 1.3

Temperature values for babies born at a gestational age of $\leq 28^{+6}$ weeks who had their temperature taken within an hour of birth; infants are assigned to their place of birth

Unit level	Eligible babies	Temperature values (°C)				
		< 32.0	32.0-35.9 (as % of eligible babies)	36.0-36.5 (as % of eligible babies)	36.6-37.5	>37.5
Other*	21	2	17 (81%)	. (.%)	1 (5%)	1
1	134	.	33 (25%)	43 (32%)	48 (36%)	10
2	819	.	157 (19%)	222 (27%)	347 (42%)	93
3	1533	1	242 (16%)	446 (29%)	677 (44%)	167
Total	2507	3	449 (18%)	711 (28%)	1073 (43%)	271

NNAP, 1st January - 31st December 2011

**Babies are assigned to the hospital of birth or 'Other' if born at home, in transit, in an unknown location or in a non NNAP unit.*

Figures showing the recorded temperature values for babies who had their temperature taken within the first hour of birth for individual neonatal units are available in the web-based report. 

Question 2

Audit: Are all mothers who deliver their babies between 24⁺⁰ and 34⁺⁶ weeks gestation given ANY dose of antenatal steroids?

Standard: 85% of mothers to receive any dose of antenatal steroids

Source of Standard: NNAP Board

Results:

There were **15716** mothers reported from **164** neonatal units who met the selection criteria (eligible cases). At least one dose of antenatal steroids was administered to **76%** (12009/15716) of mothers who delivered babies between 24⁺⁰ and 34⁺⁶ weeks gestation. Antenatal steroids were not administered in **20%** (3192/15716) of the cases and data were missing for **3%** (515/15716) (Table 2.1). Results are shown for each neonatal unit in figures 2.1.1, 2.1.2 and 2.1.3.

Table 2.1

Mothers who delivered their babies between 24⁺⁰ and 34⁺⁶ weeks and received ANY dose of antenatal steroids; mothers are assigned to place of birth

Unit level	Eligible mothers	Steroids given (as % of all eligible mothers)	Steroids not given	Missing data
Other*	222	85 (38%)	126	11
1	2051	1467 (72%)	507	77
2	6853	5262 (77%)	1352	239
3	6590	5195 (79%)	1207	188
Total	15716	12009 (76%)	3192	515

NNAP, 1st January - 31st December 2011

**Responses are assigned to the hospital of birth or 'Other' if delivered at home, in transit, in an unknown location or in a non NNAP unit.*

Table 2.2

Five year trend on use of antenatal steroids

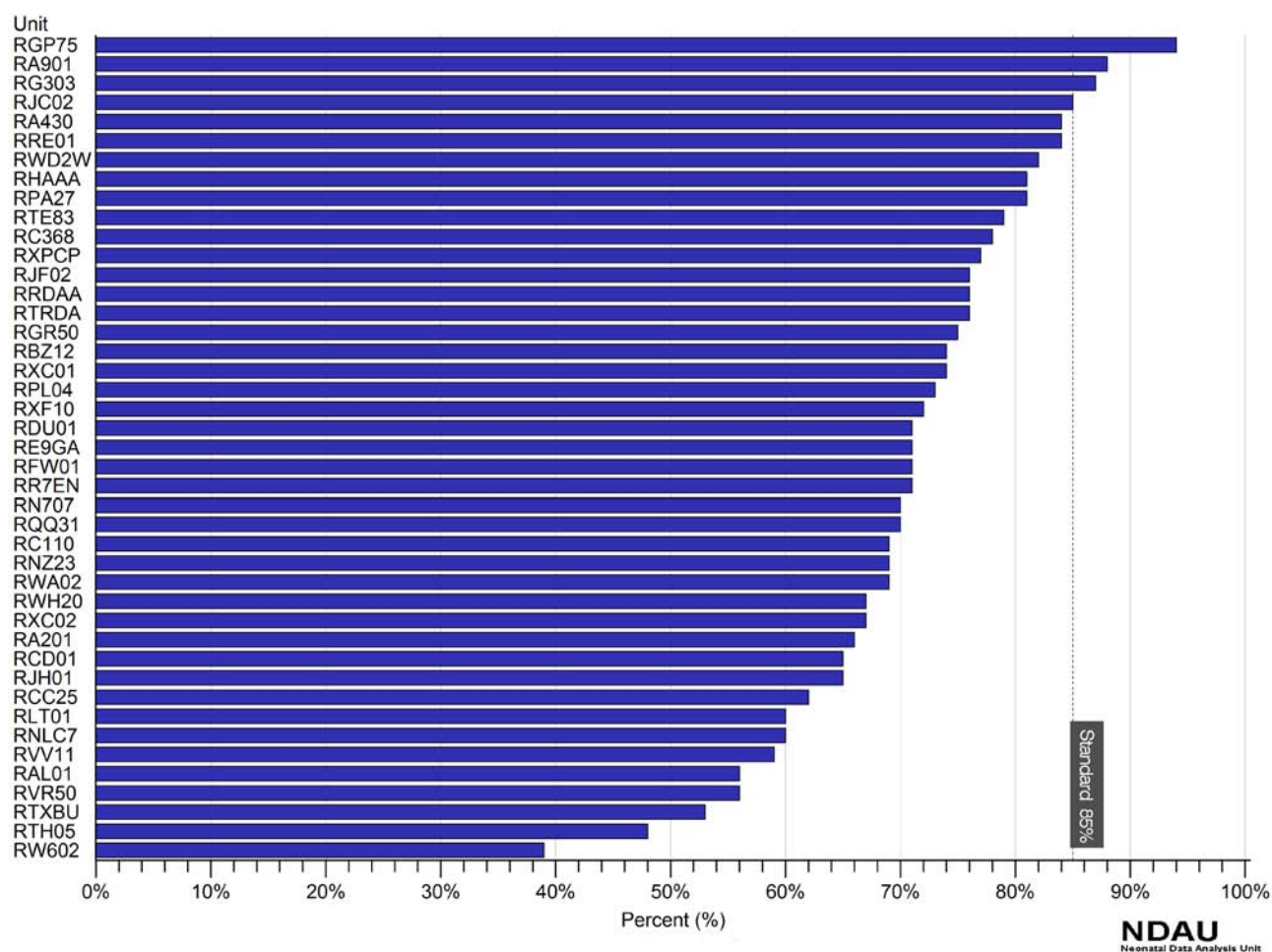
Year	Eligible mothers	Percentage given steroids
2007	4765	90%
2008	9066	63%
2009	16031	70%
2010	16895	75%
2011	15716	76%

Comment

Although there appears to be an improvement in the percentage of mothers who received antenatal steroids from 2008 to 2011, particularly high values were recorded in the 'early recruiters' into NNAP. It is unclear whether this is because of diligent data recording, high standards of clinical obstetric practice, or the population served. The rising numbers reflect recruitment of units into NNAP, with a slight reduction in 2011 with the loss of some TNS-only units.

Figure 2.1.1

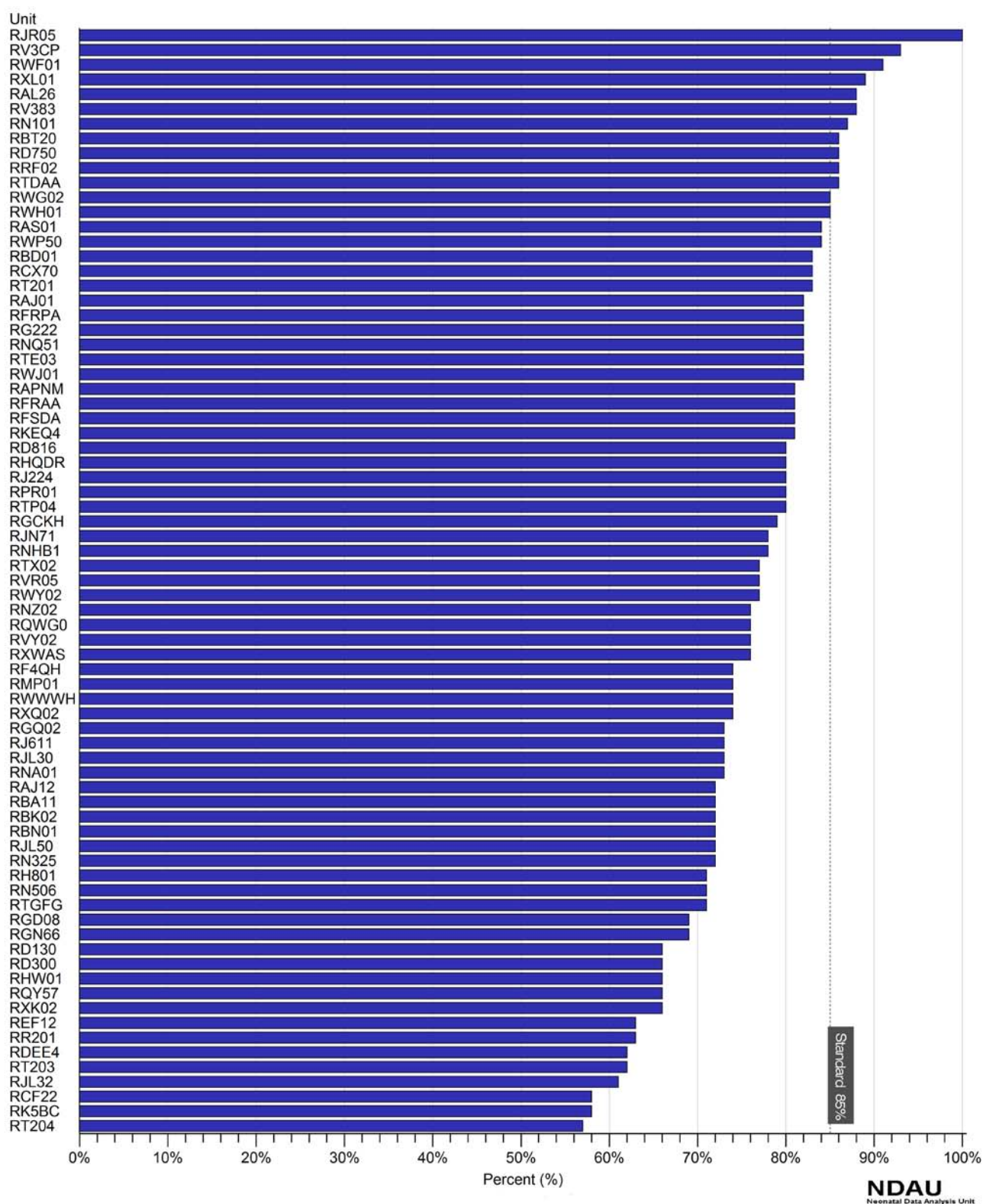
The proportion of eligible mothers receiving any dose of antenatal steroids for individual neonatal units: **Level 1**



NNAP, 1st January - 31st December 2011

Figure 2.1.2

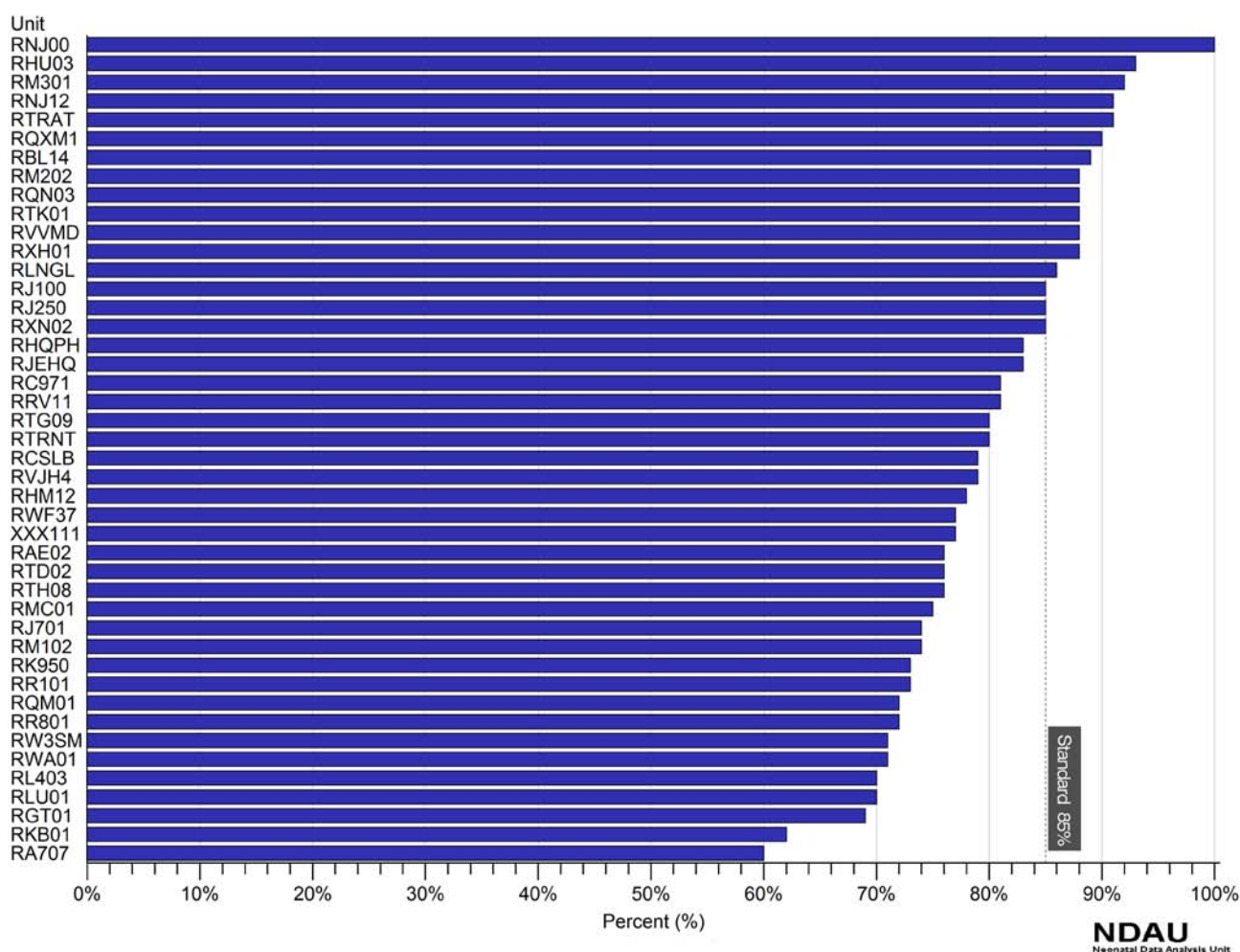
The proportion of eligible mothers receiving any dose of antenatal steroids for individual neonatal units: **Level 2**



NNAP, 1st January – 31st December 2011

Figure 2.1.3

The proportion of eligible mothers receiving any dose of antenatal steroids for individual neonatal units: **Level 3**



NNAP, 1st January - 31st December 2011

A funnel plot of these data for individual units is available in the web-based report. [🔗](#)

Question 3

Audit: Do all babies <1501g or gestational age at birth <32⁺⁰ weeks and still an inpatient undergo the first Retinopathy of Prematurity (ROP) screening in accordance with the current guideline recommendations?

Standard: 100% of eligible babies should receive their first ROP screening within the time windows recommended in the guidelines (see below).

Screening for ROP is indicated as follows:

- If the infant's gestational age at birth is <27⁺⁰, the first screening should be between 30 and 31 weeks corrected gestation
- If the infant's gestational age at birth is $\geq 27^{+0}$ and <32⁺⁰ weeks, ROP screening should take place between 4 and 5 weeks of age
- If the infant's gestational age is $\geq 32^{+0}$ weeks but with a birth weight <1501g, ROP screening should take place between 4 to 5 weeks of age
- All babies <32⁺⁰ weeks gestational age or birth weight <1501 grams should have their first ROP screening examination prior to discharge

Source: National standard (RCPCH, RCOphth, BAPM & Bliss, *Guideline for the Screening and Treatment of Retinopathy of Prematurity, 2008*)

Note: an additional two-week screening window was designated by the Project Board for this analysis as follows:

- If the baby's gestational age at birth is <27⁺⁰ weeks, the first screening should be between 29 and 32 weeks corrected gestation.
- If the baby's gestational age at birth is ≥ 27 and <32⁺⁰ weeks, ROP screening should take place between 3 and 6 weeks of age.
- If the infant's gestational age is $\geq 32^{+0}$ weeks but with a birth weight <1501g, ROP screening should take place between 3 to 6 weeks of age

Results:

There were **8551** babies born with a birth weight <1501g birth weight or at a gestational age at birth <32⁺⁰ weeks in NNAP contributing neonatal units. Of these babies, **24** babies were excluded because the infant did not have a recorded episode of care until after the close of the screening window as they were cared for during that time on a non-NNAP unit. **640** babies were excluded because they were not screened on time and died before the closure of the screening window. This left **7887** eligible babies for the analysis from **164** neonatal units.

Of eligible babies, **82%** (6460/7887) were screened for ROP. **67%** (5310/7887) **were screened during the expanded screening window although this was not always their first screening**. **3%** (233/7887) were screened early – with no screening during the designated window; **12%** (917/7887) were screened late whilst still in neonatal care or were not screened until after discharge; and **18%** (1427/7887) had no available screening data (Table 3.1). ROP screening for each neonatal unit reporting the screening is shown in figures 3.2.1, 3.2.2 and 3.2.3.

NB: Due to the complex nature of the ROP analysis the following explanatory notes for table 3.1 are provided:

- **‘Eligible babies’:** where the ROP screening took place within the expanded screening window then the neonatal unit performing this screening was responsible for the screening.
 - If no ROP screening was recorded within the expanded screening window and the infant was discharged alive from neonatal care before or during the expanded window then the neonatal unit discharging the infant to home or ward was responsible for the screening.
 - If no ROP screening was recorded within the expanded screening window and the infant was discharged after the window closed the neonatal unit caring for the baby at the close of the expanded screening window was responsible for the screening.
- **‘Number of babies with a known ROP screening’:** at least one ROP screening date was recorded.
- **‘On time’ screening:** at least one ROP screening date took place within the expanded screening window, if there were multiple ROP screening dates within the window then the first ‘on time’ ROP screening date was used for analysis.
 - If the infant was discharged before the expanded screening window began the ROP screening was also considered to be ‘on-time’ according to the RCPCH guidelines.
- **‘Early’ screening:** the only ROP screening date recorded was before the expanded screening window began.
- **‘Late’ screening:** the only ROP screening date recorded was after the expanded screening window closed, or the infant’s first known screening was recorded as happening after their discharge from neonatal care.
- **‘Number of babies not screened’:** there was no ROP screening date recorded.

Table 3.1

Screening for ROP: babies born <1501g or gestational age at birth <32⁺⁰ weeks and present in a neonatal unit at the time of eligibility for ROP screening

Unit level	Eligible babies	Number of babies with a known ROP screening (% of eligible babies)	ROP screening on time (% of eligible babies)	ROP screening early (% of eligible babies)	ROP Screening late		Number of babies not screened (% of eligible babies)
					On unit (% of eligible babies)	Post discharge (% of eligible babies)	
1	1056	750 (71%)	595 (56%)	41 (4%)	54 (5%)	60 (6%)	306 (29%)
2	3335	2646 (79%)	2163 (65%)	106 (3%)	198 (6%)	179 (5%)	689 (21%)
3	3496	3064 (88%)	2552 (73%)	86 (2%)	308 (9%)	118 (3%)	432 (12%)
Total	7887	6460 (82%)	5310 (67%)	233 (3%)	560 (7%)	357 (5%)	1427 (18%)

Table 3.2 Five year trend for screening for retinopathy of prematurity

Year	Eligible babies	Number of babies with known ROP screening (% of eligible babies)	ROP screening known		
			On time (% of screened babies)	Early (% of screened babies)	Late (% of screened babies)
2007	2751	1034 (38%)			
2008	3414	1936 (57%)			
2009	7913	5336 (67%)	2098 (27%)	1859 (23%)	1379 (17%)
2010	8235	5853 (71%)	4777 (48%)	308 (4%)	768 (9%)
2011	7887	6460 (82%)	5310 (67%)	233 (3%)	917 (13%)

The data show an increasing proportion of eligible babies being screened for ROP, and of those being screened, an increasing proportion are screened on time. The rising numbers reflect recruitment of units into NNAP, with a slight reduction in 2011 with the loss of some TNS-only units.

Figure 3.1
Funnel plot comparing unit results in the 'ROP screening within recommended window' standard (100%)

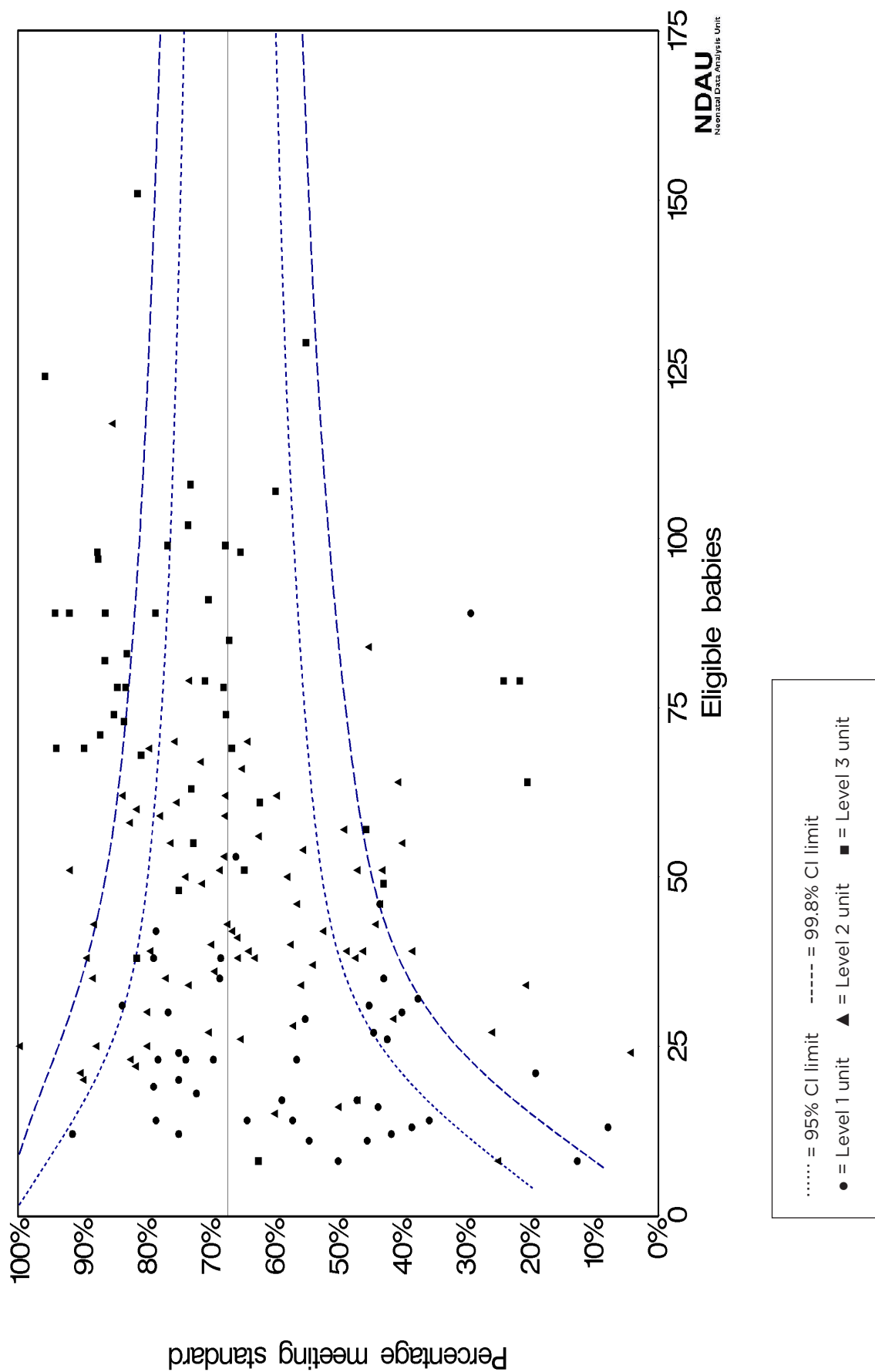
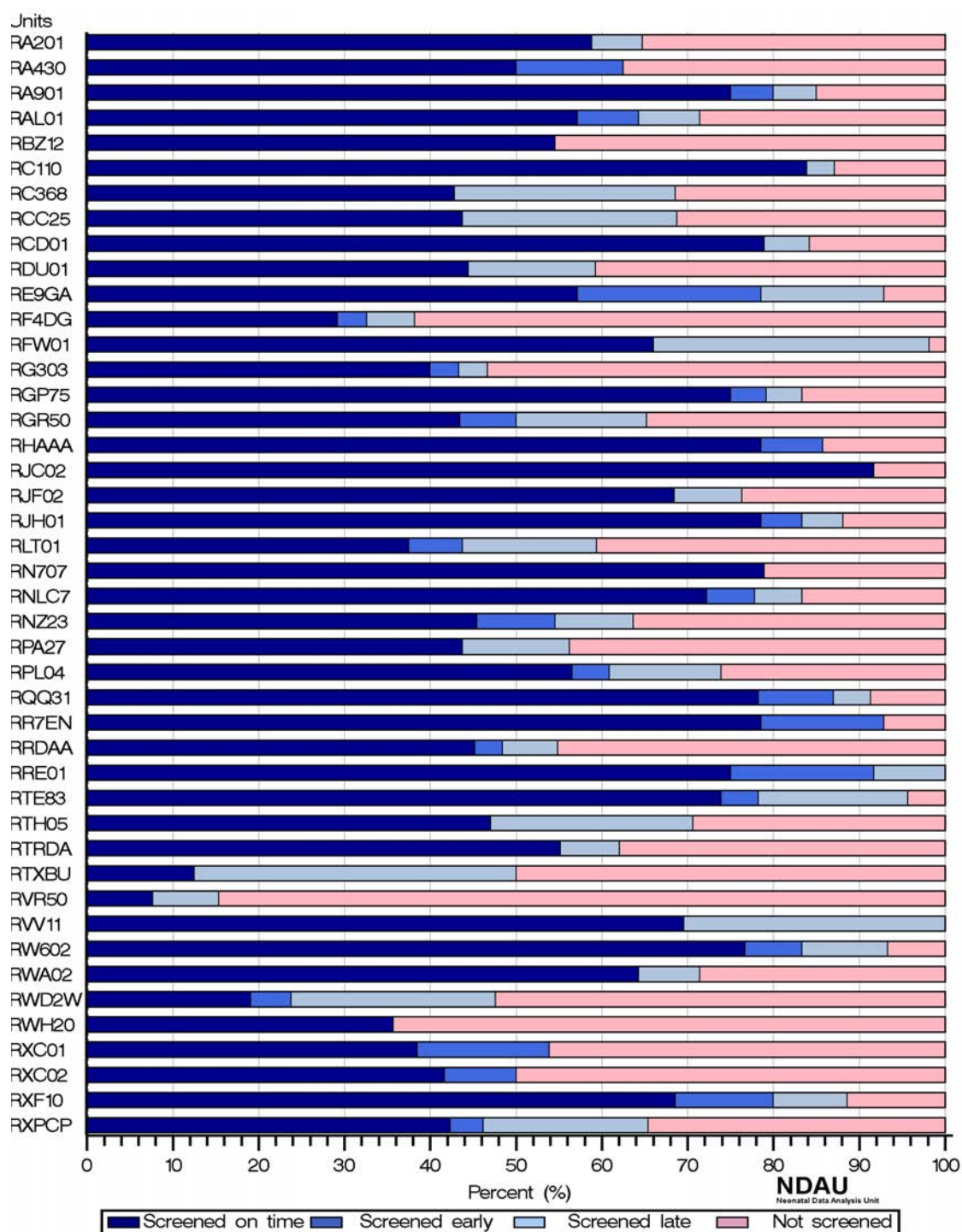


Figure 3.2.1

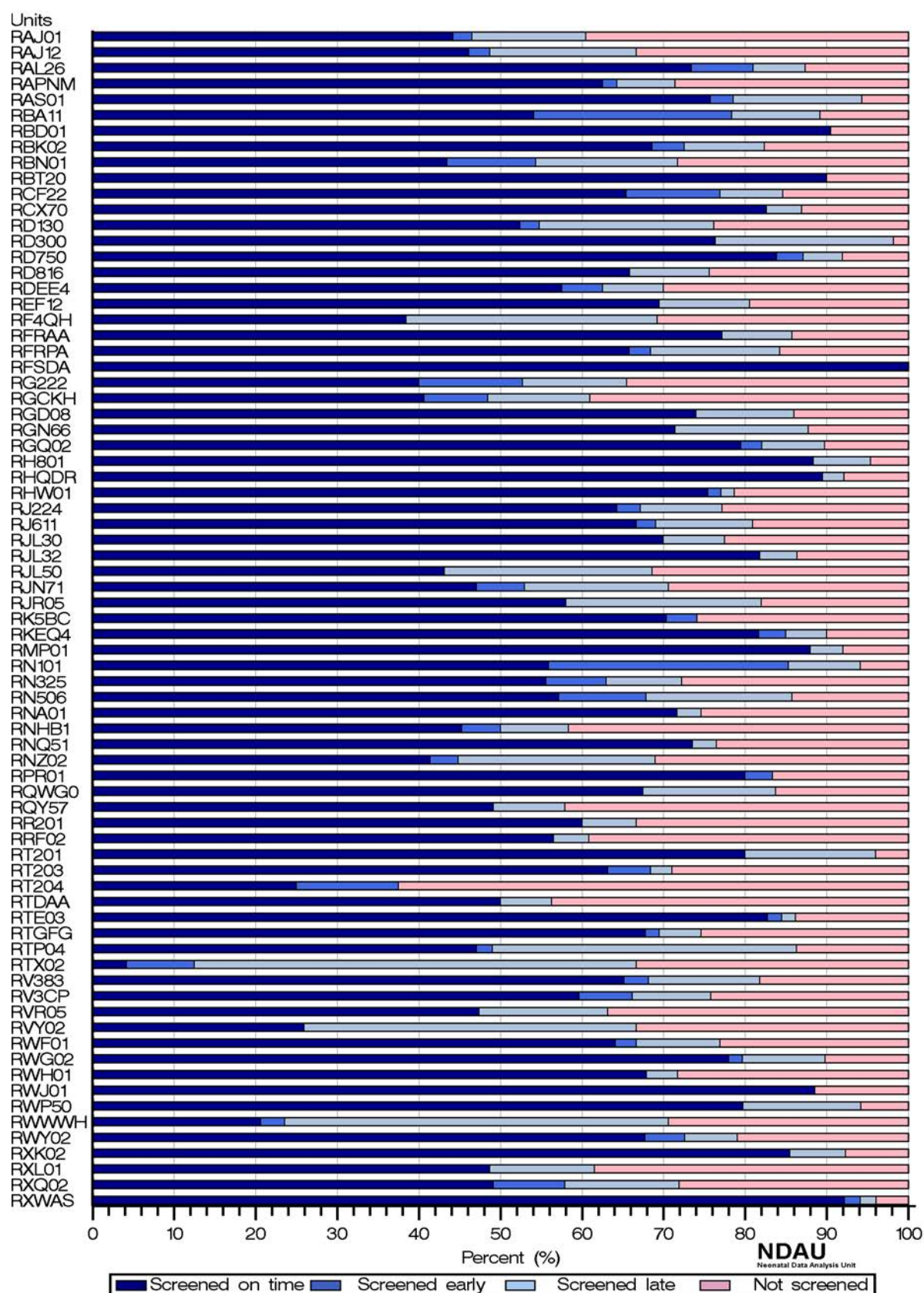
The proportion of eligible babies screened for ROP on time, early, late or not screened, for individual neonatal units: **Level 1**



NNAP, 1st January - 31st December 2011

Figure 3.2.2

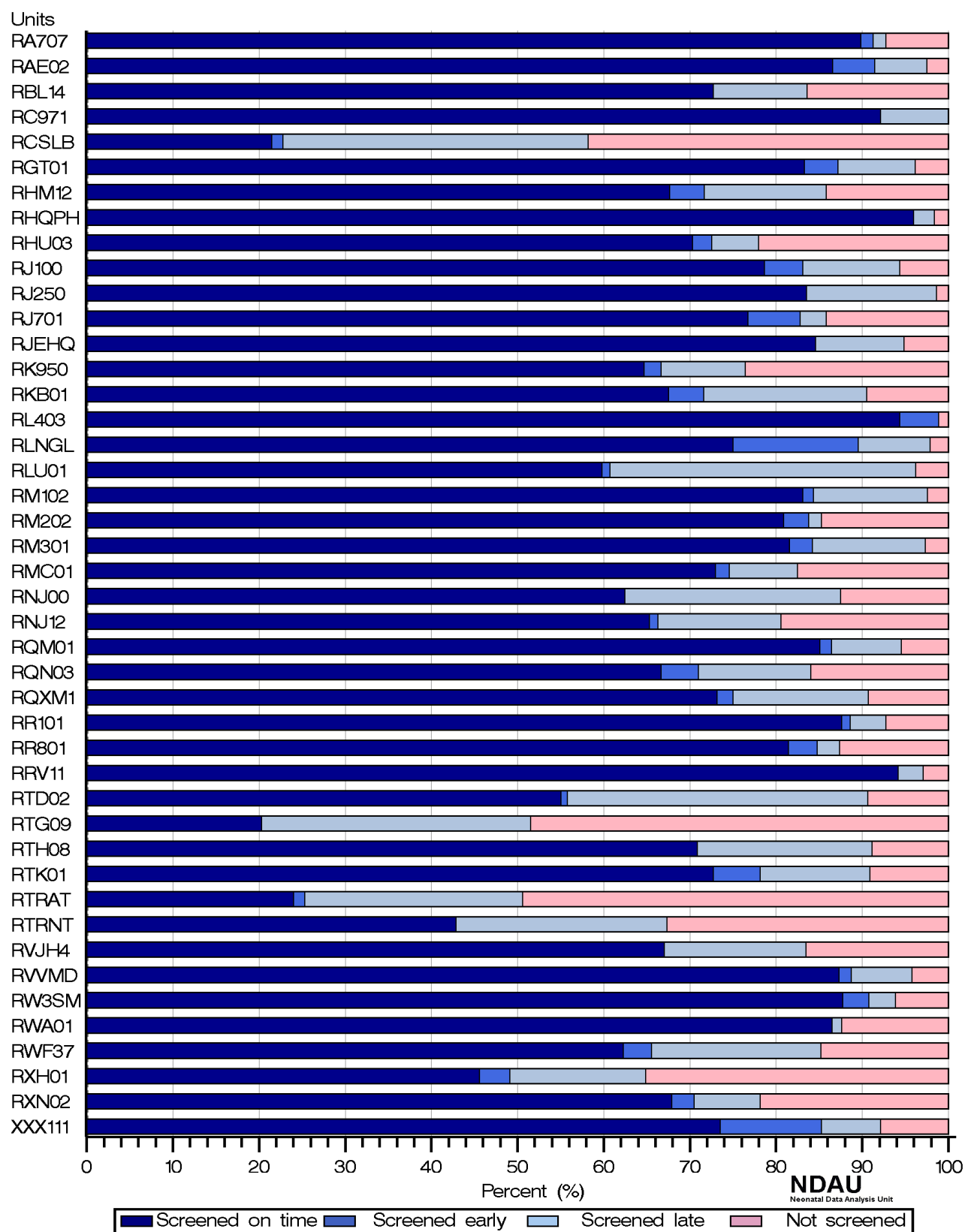
The proportion of eligible babies screened for ROP on time, early, late or not screened, for individual neonatal units: **Level 2**



NNAP, 1st January - 31st December 2011

Figure 3.3.3

The proportion of eligible babies screened for ROP on time, early, late or not screened, for individual neonatal units: **Level 3**



NNAP, 1st January - 31st December 2011

Question 4

Audit:	What proportion of babies <33 ⁺⁰ weeks gestation at birth were receiving any of their own mother's milk at discharge to home from a neonatal unit?
Standard:	Benchmarking
Source of standard:	NNAP Board

Results:

Only babies who had a final discharge to home at the end of their first episode of care are included in this analysis.

There were **5578** babies born <33⁺⁰ weeks reported by **159** neonatal units who met the selection criteria above. **54%** (3007/5578) were receiving their own mother's milk or a combination of mother's milk and formula at final discharge. **44%** (2438/5578) were discharged receiving formula milk only. Missing data, where feeding at discharge was not entered, accounted for the remaining **2%** (133/5578). (Table 4.1)

Table 4.1

Babies born <33⁺⁰ weeks and receiving any of their mother's milk at final discharge from a neonatal unit by unit level

Unit Level	Eligible babies	Feeding at discharge			
		Mother's milk only (as % of eligible babies)	Mother's milk and formula (as % of eligible babies)	Formula only (as % of eligible babies)	Missing data (as % of eligible babies)
1	504	184 (37%)	92 (18%)	212 (42%)	16 (3%)
2	2676	879 (33%)	588 (22%)	1136 (42%)	73 (3%)
3	2398	811 (34%)	453 (19%)	1090 (45%)	44 (2%)
Total	5578	1874 (34%)	1133 (20%)	2438 (44%)	133 (2%)

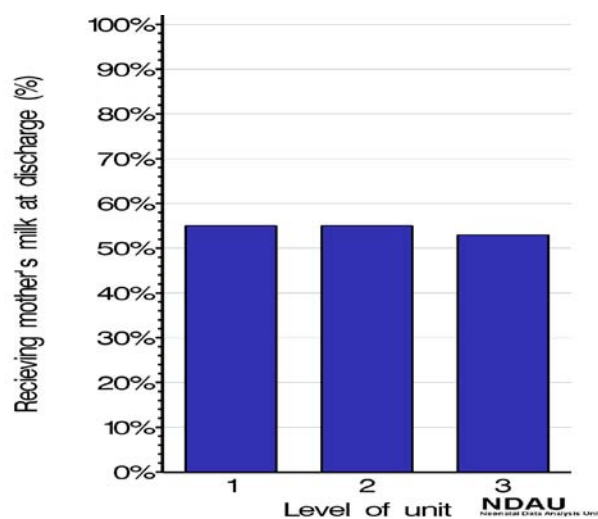
NNAP, 1st January - 31st December 2011

This question changed in 2010 from analysing if a baby had received mother's milk at any time during a stay on a NNU to whether mother's milk was being fed at the time of discharge. A time trend analysis is therefore not provided.

Babies receiving mother's milk at final discharge by neonatal unit level is shown in figure 4.1, by gestational age at birth in figure 4.2 and for each neonatal unit in figures 4.4.1, 4.4.2 and 4.4.3.

Figure 4.1

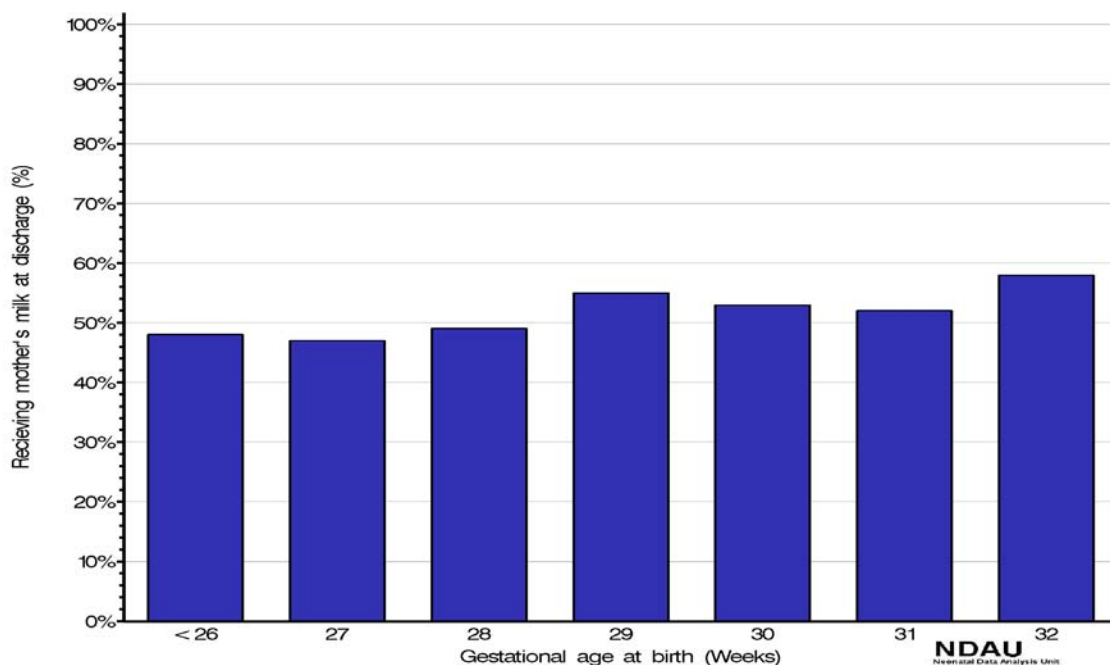
The proportion of babies receiving any of their mother's milk at final discharge, by unit level



NNAP, 1st January - 31st December 2011

Figure 4.2

The proportion of babies receiving any of their mother's milk at final discharge, by gestational age at birth (weeks)



NNAP, 1st January - 31st December 2011

Figure 4.3

Funnel plot showing the proportion of infants receiving any of their mother's milk at discharge by neonatal unit

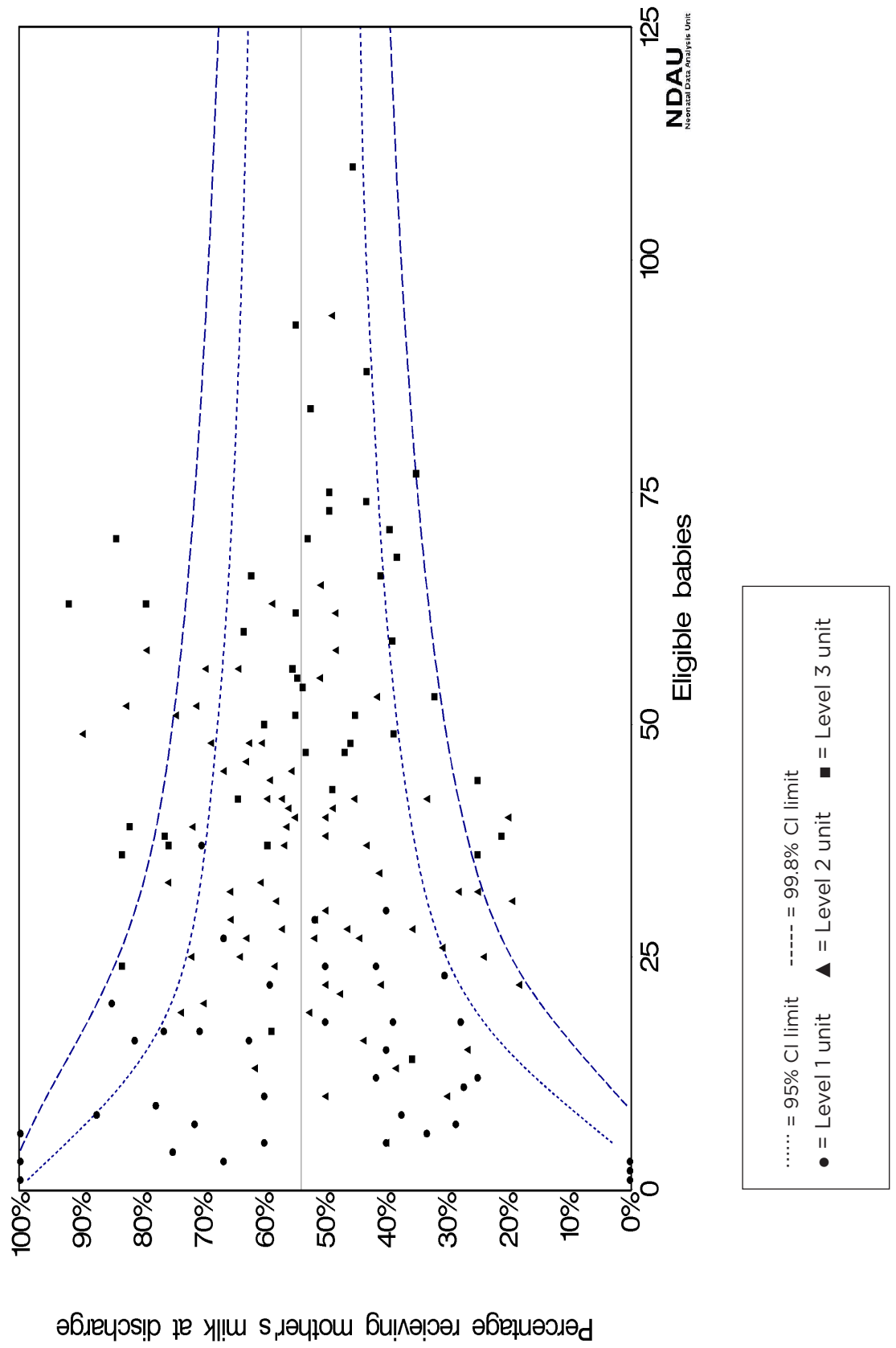
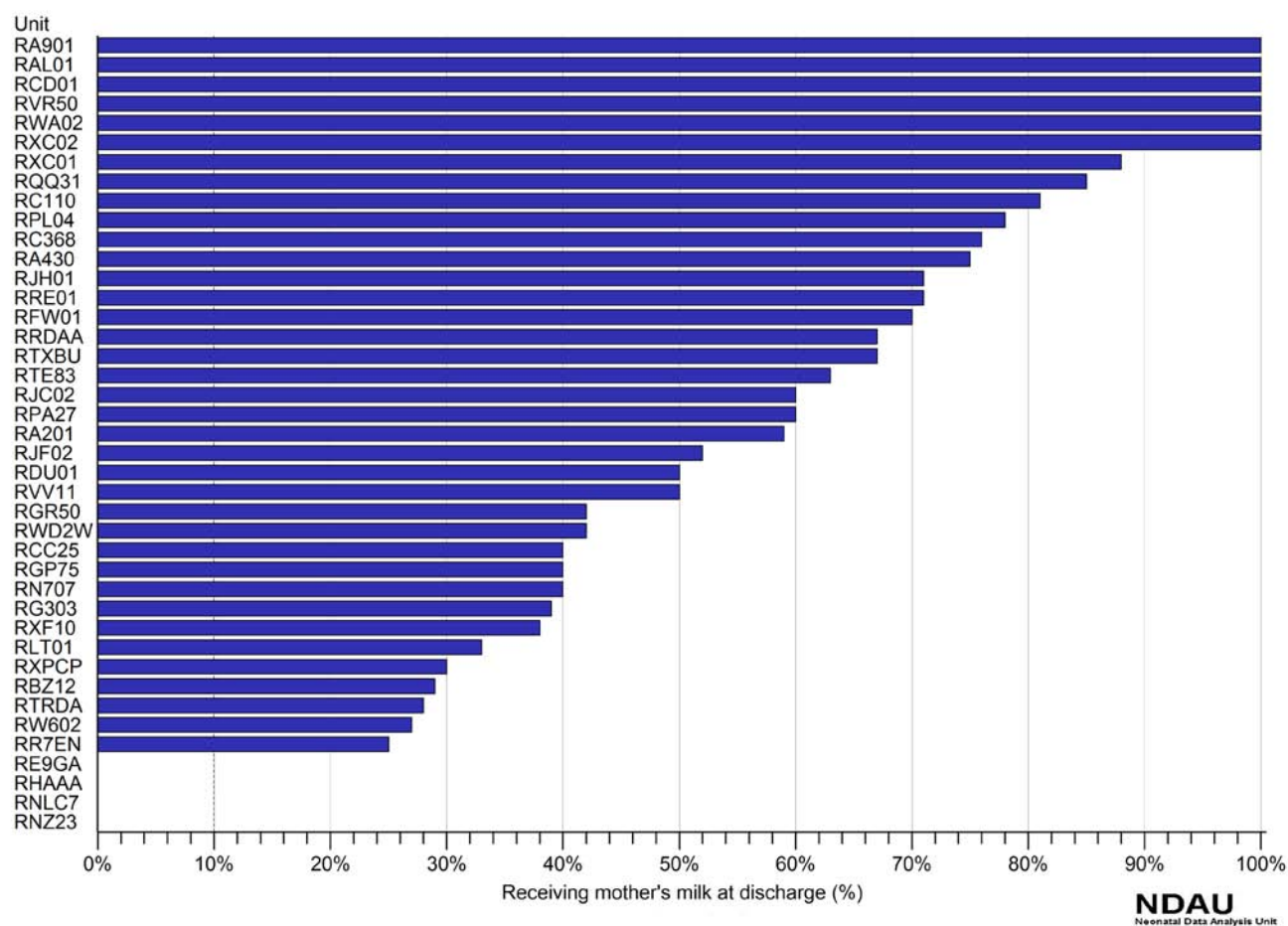


Figure 4.4.1

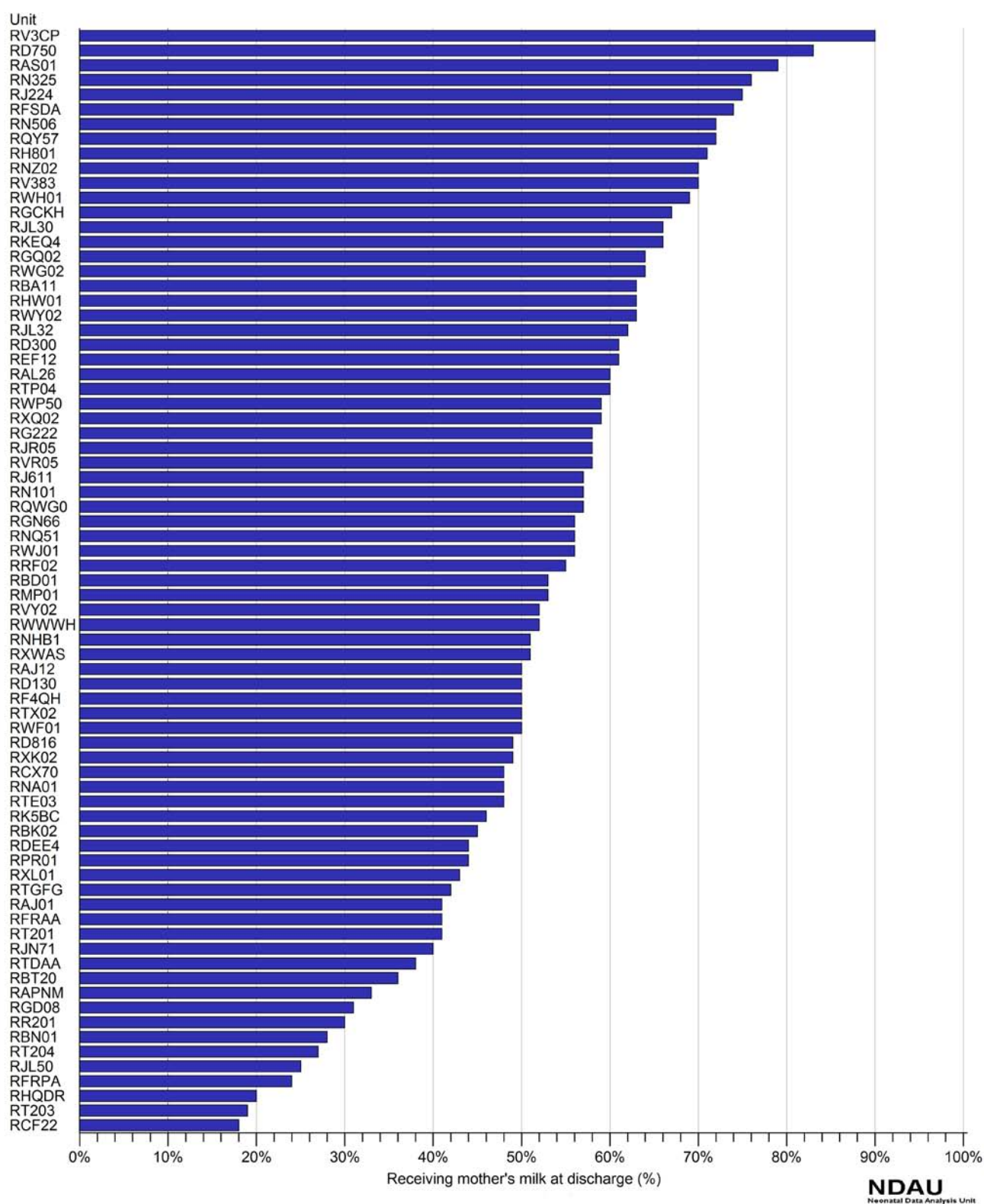
The proportion of eligible babies receiving any of their mother's milk at final discharge for individual neonatal units: **Level 1**



NNAP, 1st January - 31st December 2011

Figure 4.4.2

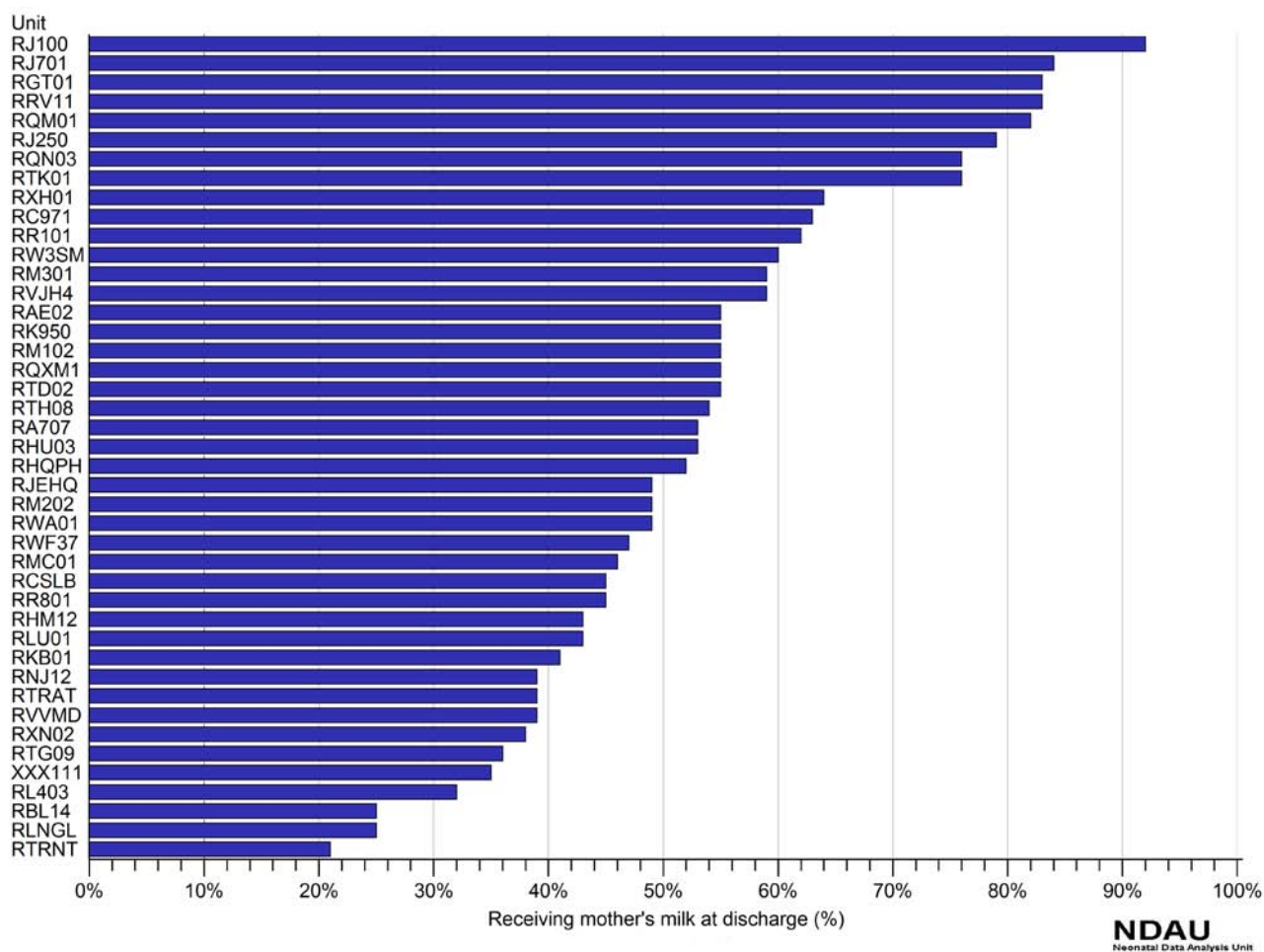
The proportion of eligible babies receiving any of their mother's milk at final discharge for individual neonatal units: **Level 2**



NNAP, 1st January - 31st December 2011

Figure 4.4.3

The proportion of eligible babies receiving any of their mother's milk at final discharge for individual neonatal units: **Level 3**



NNAP, 1st January - 31st December 2011

Question 5

Audit: Is there a documented consultation with parents/carers by a senior member of the neonatal team* within 24 hours of admission?

Standard: 100%

Source of Standard: NNAP Board

*A senior member of the neonatal team is defined as a Consultant, Associate Specialist, Specialist Registrar, Staff Grade doctor or a Speciality Doctor/ANNP acting as a SpR.

Results:

There were **67969** first episodes reported by **164** neonatal units that were considered for this question. A further check was then applied, requiring infants to be receiving care marked as HRG 1,2 or 3 on their first day of care with a 'location of care = NICU' were included in the analysis; babies in categories HRG 4 and 5 were excluded, and left **50469** episodes eligible for the study.

A senior member of the neonatal team saw **68%** (34450/50469) of eligible cases within 24 hours of admission. Missing data, and times set before admission, accounted for **27%** (13730/50469) of episodes and **5%** (2289/50469) were seen after 24 hours of admission. The percentage of all parents/carers who had a consultation with a senior member of staff is shown by level of unit (Table 5.1). Consultation by a senior member of the neonatal team by unit level (Figure 5.1), by gestational age at birth (Figure 5.2) and for each neonatal unit in figures 5.4.1, 5.4.2 and 5.4.3

Table 5.1

Numbers of parents and/or carers of babies seen by a senior member of the neonatal team within 24 hours of admission by unit level

Unit Level	Eligible episodes	Time of first consultation			
		Within 24 hours (as % of eligible babies)	After 24 hours (as % of eligible babies)	Before admission (as % of eligible babies)	Missing Data (as % of eligible babies)
1	8407	5557 (66%)	362 (4%)	910 (11%)	1578 (19%)
2	23041	16104 (70%)	815 (4%)	2856 (12%)	3266 (14%)
3	19021	12789 (67%)	1112 (6%)	2092 (11%)	3028 (16%)
Total	50469	34450 (68%)	2289 (5%)	5858 (12%)	7872 (16%)

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Table 5.2

Time trend for consultation with senior staff (all units)

Year	Eligible episodes	Time of first consultation			
		Within 24 hours (as % of eligible episodes)	After 24 hours (as % of eligible episodes)	Before admission (as % of eligible episodes)	Missing Data (as % of eligible episodes)
2007	19145	6679 (35%)	-	-	6111 (32%)
2008	29438	16358 (56%)	-	-	11859 (40%)
2009	57203	25704 (45%)	6254 (11%)	Excluded from analysis	10599 (19%)
2010	60183	40199 (67%)	2514 (4%)	Excluded from analysis	17470(29%)
2011	50469	34450 (68%)	2289 (5%)	5858 (11%)	7872 (16%)

Comment

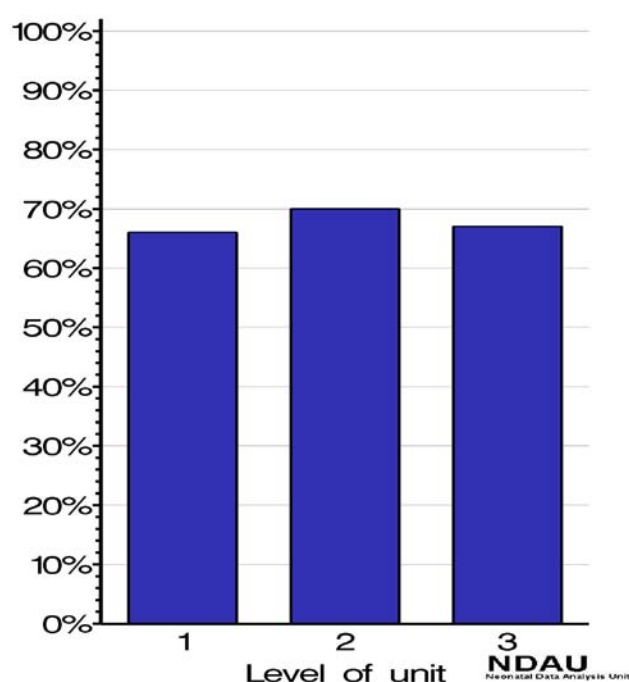
The rising numbers of eligible episodes reflect recruitment of units into NNAP, with a slight reduction in 2011 with the loss of some TNS units. It is difficult to comment on the time trends as the analyses have changed over the years of the audit. The exclusion of HRG4 and HRG5 babies and “location of care ≠ NICU” has not greatly affected the national figures, but individual units may see more notable changes in their own figures.

As is discussed elsewhere in this report (see Section 1.3), the analysis of these data has been challenging because of the various admission policies and data collection methods in different units. However, even with babies in HRG 4 and 5 and “location of care ≠ NICU” excluded from the analysis, 16% of babies have missing data in this field in 2011 and so data completion remains poor. Of the total eligible episodes in 2011, 11% were filled with data showing that the parents were

counselled prior to their baby's admission. While this is admirable clinical practice, entry of this time before admission means that the NNU involved *fails the audit question* which is clearly and specifically aimed at the consultation with the parents *after* the baby has been admitted. Units should therefore take care not to record antenatal times and enter the data only after the post-admission consultation has occurred.

Figure 5.1

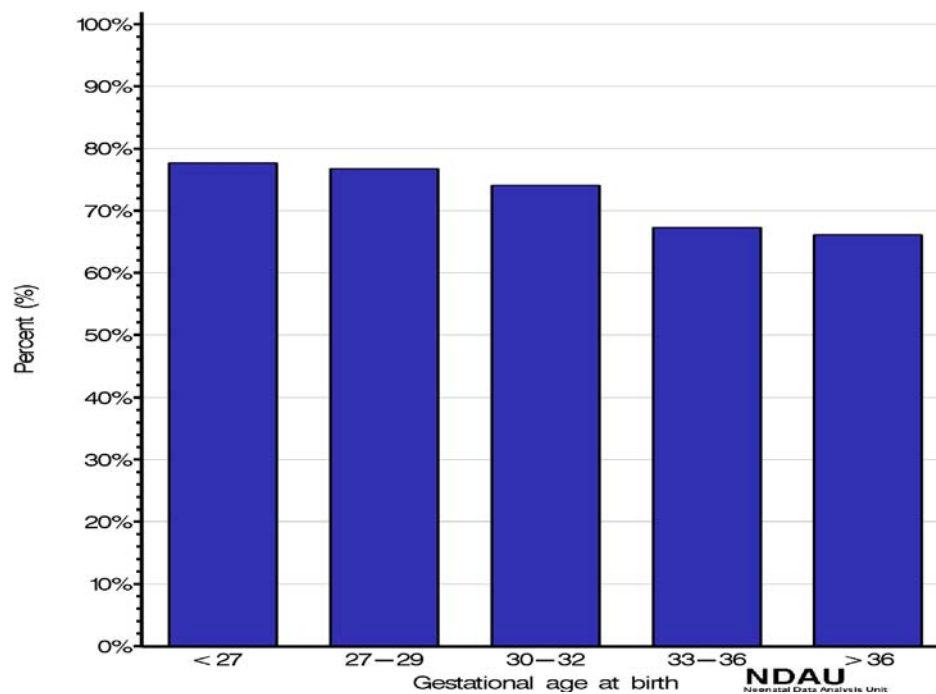
Consultations by a senior member of the neonatal team within 24 hours of admission as a proportion of all eligible babies by level of neonatal unit



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Figure 5.2

Consultations by a senior member of the neonatal team within 24 hours of admission as a proportion of all eligible babies by gestational age at birth (weeks)



NNAP, 1st January - 31st December 2011

Figure 5.3
Funnel plot comparing unit results with the “first consultation within 24 hours of admission” standard

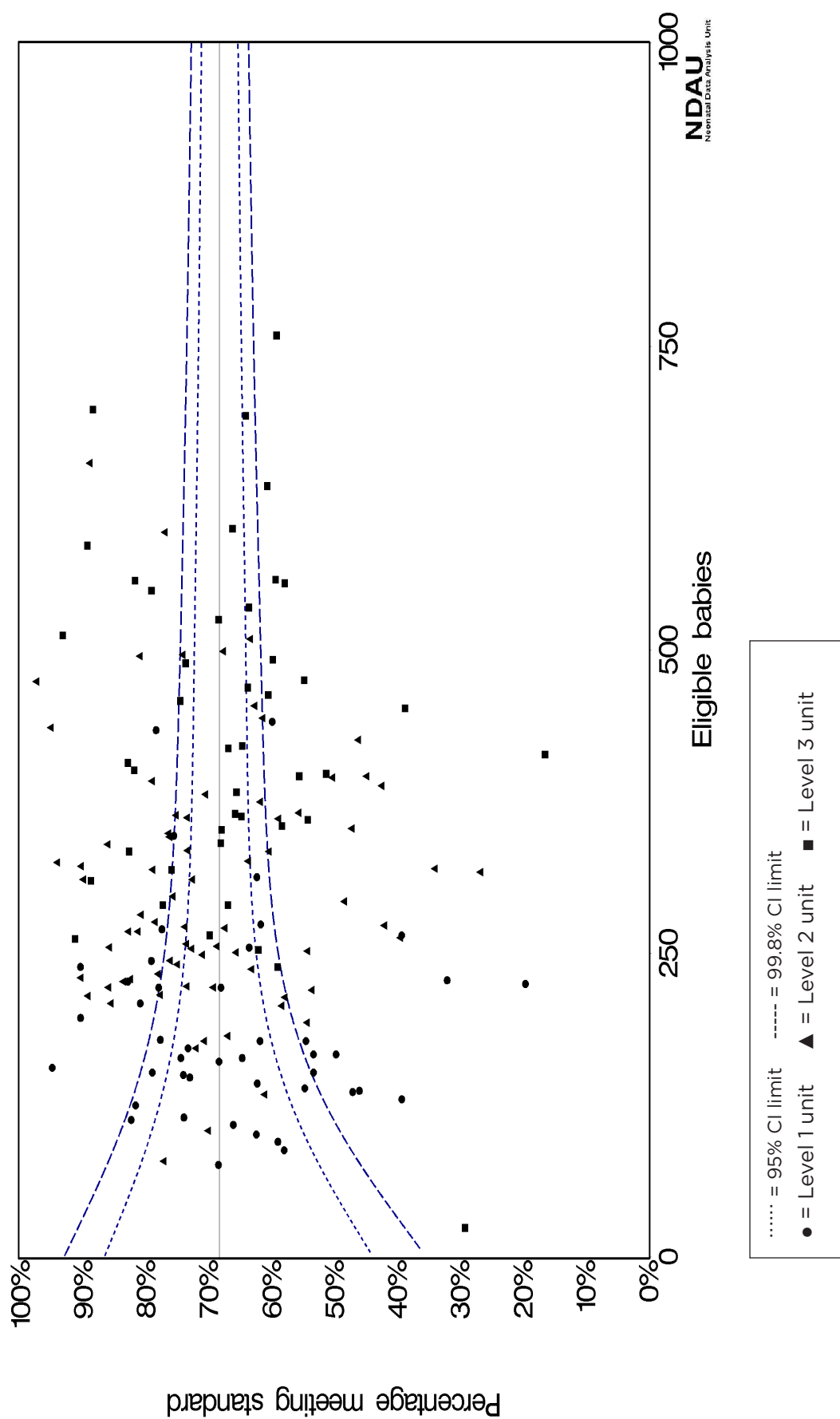
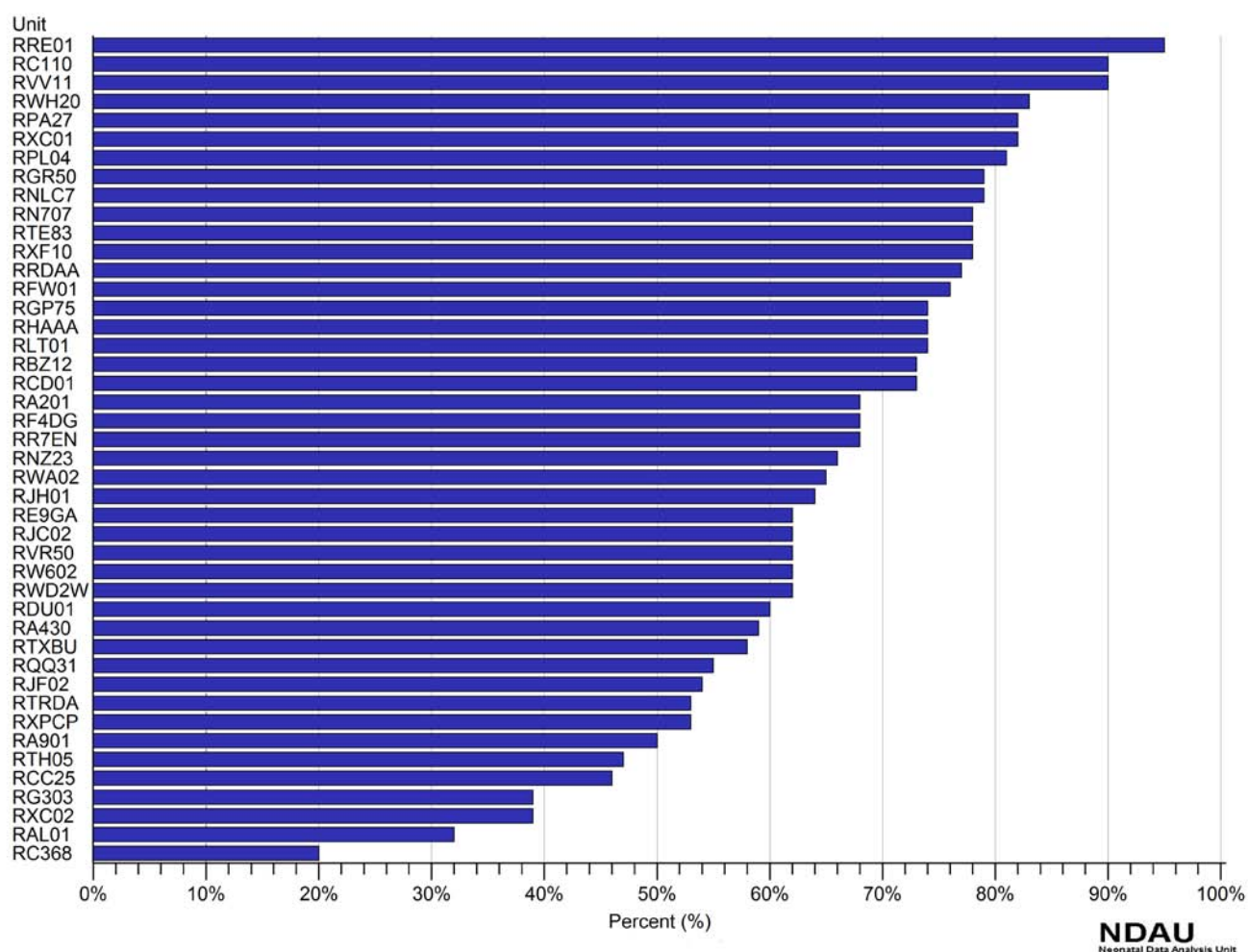


Figure 5.4.1

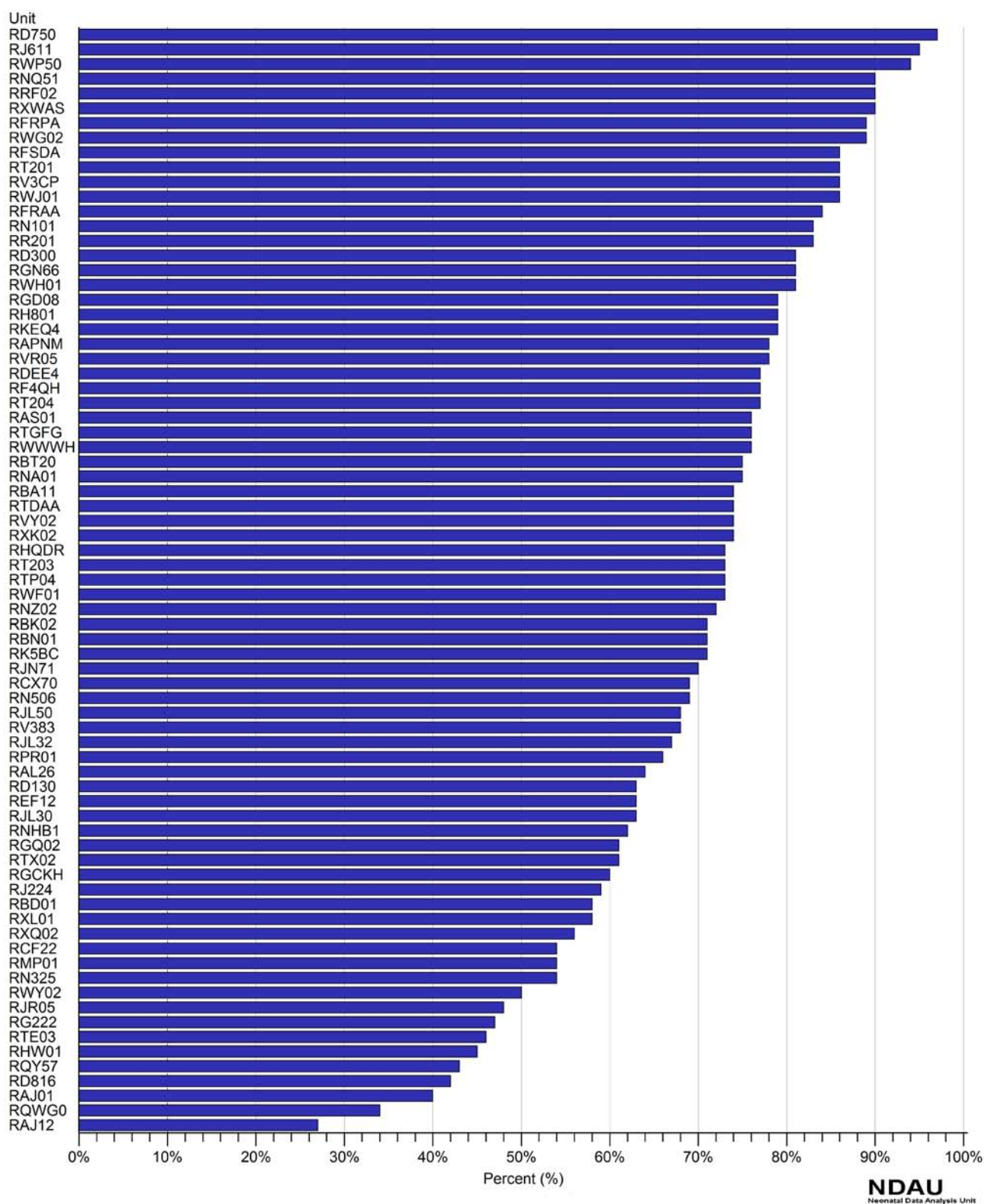
The proportion of eligible babies seen by a senior member of the neonatal team within 24 hours of admission for individual neonatal units: **Level 1**



NNAP, 1st January - 31st December 2011

Figure 5.4.2

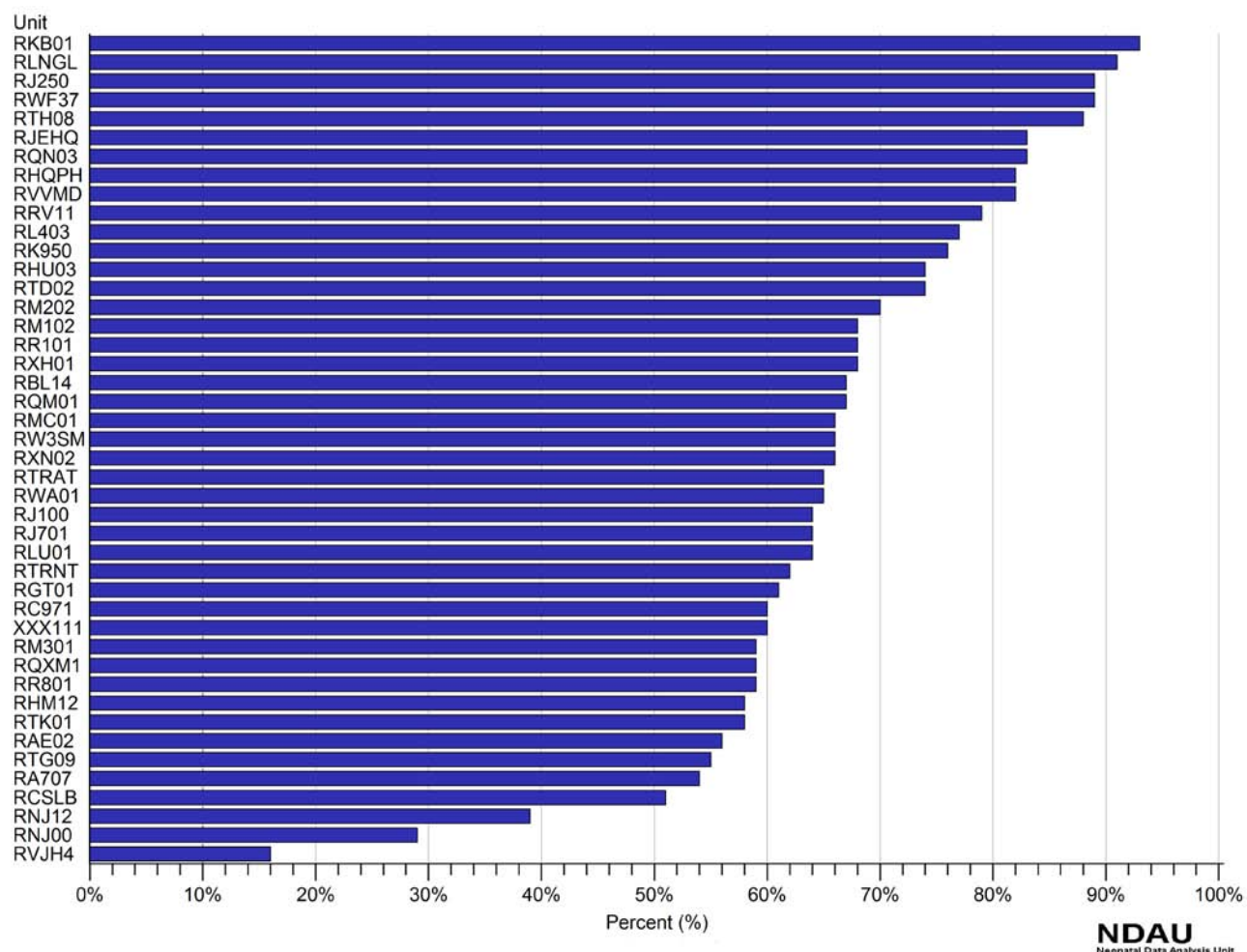
The proportion of eligible babies seen by a senior member of the neonatal team within 24 hours of admission for individual neonatal units: **Level 2**



NNAP, 1st January - 31st December 2011

Figure 5.4.3

The proportion of eligible babies seen by a senior member of the neonatal team within 24 hours of admission for individual neonatal units: **Level 3**



NNAP, 1st January - 31st December 2011

Analysis of all episodes for each unit (i.e. not only first episodes of care) is available on-line. [🔗](#)

Question 6

Audit:	Are all babies who require transfer out of a unit kept within their own network, except where clinical reasons dictate otherwise?
Standard:	>90% of the neonatal transfers
Source of standard:	NNAP Board

Results:

In the 2011 data download there were a total of **10664** transfers involving **7296** babies. This means that **11%** (7296/68261) of babies experienced at least one transfer during their time in neonatal care. **82%** (8720/10664) of transfers were within the first known network of care and **18%** (1944/10664) were to another neonatal network. Please note that NNAP has not analysed first known network of care against maternal postcode to determine what percentage of babies were born in 'their own' local network. Instead the analysis looked at the number of babies who were transferred between different neonatal units and the neonatal networks within which the neonatal units in question belonged. A transfer within network is one where a baby is transferred to another unit that belonged to the first known network of care. Conversely, a transfer outside a neonatal network is one where a baby is transferred to a unit that did not belong to the first network of care.

The number of babies admitted in 2011 by neonatal network and the percentage who were transferred within or outside the network are shown in Table 6.1.

Table 6.1
Transfer of babies out of network by 'Network Provider of First Admission' for babies discharged in 2011

Neonatal network provider	Number of babies transferred	Total number of transfers for these babies	Transfers within network (as % of all transfers)	Transfers outside of network (as % of all transfers)	Reason for transfer out of network					
					Continuing care	Specialist care	Cardiac care	Surgical care	Other reason	Missing data
Bedfordshire and Hertfordshire	234	353	251 (71%)	102 (29%)	47	27	2	21	3	2
Cheshire & Merseyside	127	151	123 (81%)	28 (19%)	26	1	.	1	.	.
Eastern	479	704	591 (84%)	113 (16%)	74	24	5	7	3	.
Greater Manchester	429	613	548 (89%)	65 (11%)	51	11	.	2	1	.
Kent	238	349	246 (70%)	103 (30%)	32	22	2	44	3	.
Lancashire and South Cumbria	133	215	141 (66%)	74 (34%)	42	12	.	17	3	.
London - North Central	337	471	340 (72%)	131 (28%)	81	21	4	21	2	2
London - North East	693	1042	899 (86%)	143 (14%)	71	47	6	16	3	.
London - North West	397	565	440 (78%)	125 (22%)	106	8	.	8	2	1
London - South East	225	328	231 (70%)	97 (30%)	74	15	1	3	3	1
London - South West	200	286	218 (76%)	68 (24%)	42	11	6	9	.	.
Midlands - Central	172	244	188 (77%)	56 (23%)	36	17	.	1	2	.
Midlands - South West	340	479	389 (81%)	90 (19%)	78	8	.	1	1	2

Neonatal network provider	Number of babies of transferred	Total number of transfers for these babies	Transfers within network (as % of all transfers)	Transfers outside of network (as % of all transfers)	Reason for transfer out of network					Missing data
					Continuing care	Specialist care	Cardiac care	Surgical care	Other reason	
North Trent	419	605	468 (77%)	137 (23%)	102	17	8	4	4	2
Northern	286	441	428 (97%)	13 (3%)	10	3	.	.	.	.
Peninsula - South West	224	339	260 (77%)	79 (23%)	32	11	3	31	2	.
South Central (North)	288	394	328 (83%)	66 (17%)	51	7	1	6	1	.
South Central (South)	315	445	396 (89%)	49 (11%)	39	5	.	5	.	.
Staffordshire, Shropshire and Black Country Newborn Network	138	184	137 (74%)	47 (26%)	37	5	1	2	1	1
Surrey and Sussex	350	549	406 (74%)	143 (26%)	80	24	3	35	1	.
Trent	241	383	324 (85%)	59 (15%)	41	14	.	2	1	1
Western	647	939	861 (92%)	78 (8%)	69	5	.	3	1	.
Yorkshire	384	585	507 (87%)	78 (13%)	44	18	.	9	6	1
Total	7296	10664	8720 (82%)	1944 (18%)	1265	333	42	248	43	13

Comment

Changes in network boundaries, and changes in referral patterns for neonatal surgery and cardiac care over the years have made this a difficult question to answer meaningfully. No clear trend over time has been established.

Table 6.2

Transfer of babies out of network by 'Network provider of first admission' 2009–2011

Year	Total number of NNAP babies	Total transfers	Total number of babies involved in transfers (% of all NNAP babies)	Number of transfers outside network (% of total transfers)
2009	57203	14109	10939 (19%)	1394 (10%)
2010	60900	9214	6477(11%)	1810 (20%)
2011	68192	10664	7296 (11%)	1944 (18%)

Question 7

Audit: How many babies born between 32⁺⁰ and 36⁺⁶ weeks and $\geq 37^{+0}$ weeks gestation receive care on a neonatal unit?

Standard: Benchmarking question

Results:

Analysis for this question has been limited to those Trusts that provided denominator data. At the time of analysis, **88** Trusts had provided denominator data relating to **104** neonatal units. Trusts were asked to provide the total number of live births in 2011, and then a breakdown of this figure by gestational age to be used for analyses. In cases where the difference between these two sets of figures was greater than **5%** the Trust has been excluded (1 trust). Cases where the denominator provided was judged to be incomplete were also excluded (2 trusts). In total, the table below features data for **85** Trusts and **101** units. Thus **38%** (63/164) of contributing units have failed to provide appropriate data for analysis.

Admissions were assigned based on a baby's first episode, with the condition that the infant must have been admitted within their first week of birth for at least 24 hours, and have experienced care under the category of HRG 1,2 or 3 and 'location of care = NICU' at some point in their first episode of care. **46%** (10735/23422) of infants born between 32⁺⁰ and 36⁺⁶ weeks gestational age were admitted to neonatal care. **4%** (11950/367686) of infants born at 37⁺⁰ were also admitted. In total, **6%** (22942/397067) of infants born at 32⁺⁰ weeks gestation or higher received neonatal care.

Table 7.1 The number of babies who received neonatal care in 2011 by NHS Trust

Trust	32-36 weeks		≥ 37 weeks		Total (≥ 32 Weeks)	
	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births
Airedale NHS FT	71 (55%)	130	78 (3%)	2324	149 (6%)	2454
Ashford and St Peter's Hospitals NHS Trust	132 (63%)	208	146 (4%)	3875	278 (7%)	4083
Barking Havering and Redbridge University Trust	229 (41%)	562	276 (3%)	9001	505 (5%)	9563
Barnsley NHS FT	76 (53%)	143	94 (3%)	2842	170 (6%)	2985
Barts and the London NHS Trust	111 (32%)	343	238 (6%)	4142	349 (8%)	4485
Basildon and Thurrock University Hospital FT	127 (46%)	276	110 (3%)	3940	237 (6%)	4216
Bedford Hospital NHS Trust	91 (52%)	174	88 (3%)	3038	179 (6%)	3212
Birmingham Women's NHS FT	181 (38%)	481	374 (5%)	6861	555 (8%)	7342
Blackpool Teaching Hospitals NHS FT	94 (47%)	201	64 (2%)	2843	158 (5%)	3044

Trust	32-36 weeks		≥37 weeks		Total (≥ 32 Weeks)	
	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births
Bolton NHS FT	130 (47%)	277	139 (3%)	4542	269 (6%)	4819
Bradford Teaching Hospitals NHS FT	137 (41%)	335	175 (3%)	5541	312 (5%)	5876
Brighton & Sussex University Hospitals NHS Trust	184 (46%)	400	172 (3%)	5559	356 (6%)	5959
Burton Hospitals NHS FT	76 (31%)	246	68 (2%)	3501	144 (4%)	3747
Calderdale & Huddersfield NHS FT	145 (42%)	348	148 (3%)	5546	293 (5%)	5894
Chesterfield Royal Hospital NHS FT	100 (67%)	150	107 (4%)	2991	207 (7%)	3141
City Hospitals Sunderland	101 (46%)	218	72 (2%)	3271	173 (5%)	3489
Countess of Chester NHS Trust	88 (55%)	160	115 (4%)	3014	203 (6%)	3174
Croydon Health Services NHS Trust	138 (50%)	274	221 (5%)	4136	359 (8%)	4410
Dartford & Gravesham NHS T	161 (52%)	308	163 (4%)	4611	324 (7%)	4919
Derby Hospitals NHS FT*	-	-	-	-	197 (3%)	5959
Doncaster & Bassetlaw NHS Trust	144 (45%)	318	92 (2%)	4596	236 (5%)	4914
East Cheshire NHS Trust	35 (42%)	83	42 (2%)	1921	77 (4%)	2004
East Kent Hospitals University NHS FT	167 (41%)	412	191 (3%)	6813	358 (5%)	7225
East Lancashire Hospitals NHS Trust	171 (39%)	441	142 (2%)	6028	313 (5%)	6469
East Sussex Healthcare Trust	99 (45%)	218	102 (3%)	3945	201 (5%)	4163
East and North Hertfordshire NHS Trust	148 (46%)	319	255 (5%)	5212	403 (7%)	5531
Frimley Park Foundation Trust	142 (50%)	282	238 (5%)	5030	380 (7%)	5312
George Eliot Hospital NHS Trust	70 (49%)	144	34 (2%)	2180	104 (4%)	2324
Gloucestershire Hospitals NHS FT	153 (48%)	319	127 (2%)	6026	280 (4%)	6345
Guys & St Thomas NHS FT	146 (38%)	383	216 (3%)	6445	362 (5%)	6828
Harrogate & District NHS FT	48 (59%)	82	69 (3%)	2020	117 (6%)	2102
Heart of England Foundation Trust	285 (42%)	676	342 (3%)	9920	627 (6%)	10596
Heatherwood and Wexham Park NHS FT	154 (51%)	304	174 (4%)	4894	328 (6%)	5198
Homerton University Hospital NHS FT	162 (49%)	329	216 (5%)	4578	378 (8%)	4907

Trust	32-36 weeks		≥37 weeks		Total (≥ 32 Weeks)	
	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births
Imperial College Healthcare NHS T	103 (34%)	305	80 (2%)	4200	183 (4%)	4505
Kings College Hospital Trust	190 (66%)	287	306 (6%)	4783	496 (10%)	5070
Kingston Hospital NHS Trust	147 (49%)	299	134 (2%)	5592	281 (5%)	5891
Lancashire Teaching Hospitals NHS FT	119 (39%)	305	113 (3%)	4361	232 (5%)	4666
Leeds Teaching Hospitals NHS Trust	267 (49%)	543	317 (4%)	8908	584 (6%)	9451
Luton & Dunstable Hospital NHS FT	155 (54%)	289	224 (5%)	4869	379 (7%)	5158
Medway Hospital NHS FT	151 (46%)	326	183 (4%)	4510	334 (7%)	4836
Mid Cheshire Hospitals NHS FT	106 (52%)	205	111 (4%)	2685	217 (8%)	2890
Mid Staffs NHS FT	51 (59%)	87	77 (4%)	1736	128 (7%)	1823
Milton Keynes NHS FT	104 (43%)	244	85 (2%)	3618	189 (5%)	3862
Newcastle upon Tyne Hospitals NHS FT	141 (27%)	528	118 (2%)	6317	259 (4%)	6845
Newham University Hospital Trust	160 (31%)	508	127 (3%)	4554	287 (6%)	5062
North Tees & Hartlepool NHS FT	95 (43%)	219	88 (3%)	3316	183 (5%)	3535
North West London Hospitals NHS Trust	153 (52%)	296	246 (5%)	4746	399 (8%)	5042
Northern Devon Healthcare NHS Trust	51 (60%)	85	103 (6%)	1589	154 (9%)	1674
Northern Lincolnshire & Goole Hospitals NHS FT	181 (67%)	271	194 (5%)	4266	375 (8%)	4537
Nottingham University Hospitals Trust	234 (35%)	675	230 (2%)	10824	464 (4%)	11499
Pennine Acute Hospitals NHS Trust	279 (51%)	546	320 (3%)	9910	599 (6%)	10456
Peterborough & Stamford Hospitals NHS FT	126 (51%)	248	101 (2%)	4269	227 (5%)	4517
Poole Hospital NHS FT	98 (40%)	244	88 (2%)	4475	186 (4%)	4719
Portsmouth Hospitals NHS Trust	154 (40%)	382	135 (2%)	5655	289 (5%)	6037
Queen Elizabeth Hospital King's Lynn NHS FT	109 (80%)	136	86 (4%)	2190	195 (8%)	2326
Rotherham NHS FT	76 (45%)	168	64 (2%)	2613	140 (5%)	2781
Royal Berkshire FT	126 (39%)	320	112 (2%)	5477	238 (4%)	5797
Royal Devon & Exeter FT	155 (59%)	264	184 (5%)	3934	339 (8%)	4198
Royal Surrey County Hospital NHS F	87 (44%)	198	90 (3%)	3109	177 (5%)	3307
Salisbury NHS FT	73 (49%)	149	57 (2%)	2374	130 (5%)	2523

Trust	32-36 weeks		≥37 weeks		Total (≥ 32 Weeks)	
	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births	Admissions (as % of live births)	Live births
Scarborough NHS Trust	47 (49%)	95	51 (3%)	1630	98 (6%)	1725
Sheffield Teaching Hospitals NHS FT	186 (42%)	447	138 (2%)	6719	324 (5%)	7166
South Devon Healthcare NHS FT	84 (52%)	162	69 (3%)	2405	153 (6%)	2567
Southend Hospital NHS Trust	101 (50%)	204	100 (3%)	3640	201 (5%)	3844
St George's Healthcare Trust	144 (43%)	337	190 (4%)	4978	334 (6%)	5315
St Helens & Knowsley Teaching Hospital NHS T	83 (58%)	143	91 (3%)	3350	174 (5%)	3493
Stockport NHS FT	79 (42%)	187	67 (2%)	3579	146 (4%)	3766
Tameside NHS FT	102 (55%)	186	72 (3%)	2500	174 (6%)	2686
Taunton & Somerset NHS FT	123 (55%)	225	92 (3%)	3180	215 (6%)	3405
The Dudley Group NHS FT	161 (63%)	257	110 (2%)	4924	271 (5%)	5181
The Mid Yorkshire Hospital NHS T	181 (49%)	368	140 (2%)	6389	321 (5%)	6757
The Royal Wolverhampton NHS T	105 (38%)	276	88 (2%)	3798	193 (5%)	4074
UCLH NHS Foundation Trust	147 (37%)	394	241 (4%)	5451	388 (7%)	5845
United Lincolnshire Hospitals NHS Trust	160 (77%)	207	193 (5%)	3642	353 (9%)	3849
University Hospital of South Manchester NHS FT	100 (34%)	292	72 (2%)	3819	172 (4%)	4111
University Hospitals of Morecambe Bay NHS FT	83 (58%)	142	78 (3%)	2249	161 (7%)	2391
Warrington & Halton Hospitals NHS FT	84 (56%)	150	106 (4%)	2903	190 (6%)	3053
West Hertfordshire Hospitals NHS Trust	205 (63%)	324	348 (6%)	5473	553 (10%)	5797
West Suffolk Hospital NHS Foundation Trust	89 (57%)	156	128 (5%)	2580	217 (8%)	2736
Western Sussex NHS Trust	171 (57%)	300	185 (3%)	5336	356 (6%)	5636
Whipps Cross University Hospitals NHS T	118 (34%)	347	117 (2%)	5272	235 (4%)	5619
Wirral University Teaching Hospital NHS FT	92 (42%)	218	86 (3%)	3405	178 (5%)	3623
Wrightington Wigan & Leigh NHS FT	99 (41%)	242	54 (2%)	2847	153 (5%)	3089
Wye Valley NHS Trust	64 (70%)	92	73 (5%)	1551	137 (8%)	1643
Total	10735 (46%)	23422	11950 (3%)	367686	22942 (6%)	397067

*exact figures for infants born ≥34⁰ weeks were not separated by gestational age in weeks by this trust, and they have therefore been excluded from the '32-36' weeks and '≥37 weeks' totals. Their figures are included in the 'Total' column.

NNAP, 1st January - 31st December 2011

Question 8

Audit:	How many two year follow-ups were performed on eligible babies in 2011?
Standard:	100% of babies with data entered
Analysis:	(a) number of babies with some/all health data entered (b) number of babies lost to follow up (c) number of babies who died after discharge (d) number of babies with no data entered (e) number of babies classified as mildly/moderately/severely impaired
Source of standard:	NNAP Board

This year NNAP audited the numbers of eligible babies for whom a two year (corrected post term) health status follow-up has been partially or completely reported. Follow up data were available up to the end of 2011 and babies are usually screened at 2 years corrected age. Therefore to allow for gestational age correction and for some leeway around the 2 years, only babies born during the 12 month period between July 2008 and June 2009 were selected, as these babies should have had their follow up appointment by the end of 2011. Eligible babies were those who were born at $<30^{+0}$ weeks gestation, who survived to discharge from neonatal care. For this analysis, two year health status is assigned to the neonatal network of birth. For some birth locations (non-NHS, home, in transit or unknown) attribution to a neonatal network was not possible; these babies are shown separately.

Results:

Table 8.1 shows that there were **2978** babies $<30^{+0}$ weeks gestation born between July 2008 and June 2009 who survived to discharge from neonatal care.

- (a) **39%** (1167/2978) had any health data entered.
- (b) **5%** (148/2978) were lost to follow up or were not assessed for other reasons.
- (c) **11** babies were known to have died after discharge.
- (d) **55%** (1652/2978) had no follow up data entered at all.
- (e) From the 1167 with health data entered, **49.9%** (582/1167) of infants had no neurodevelopmental impairment, **17.7%** (207/1167) had mild/moderate impairment, **14.7%** (172/1167) had severe impairment and **17.7%** (206/1167) had insufficient data to determine the impairment category.

Impairment was categorised through the following method:

From the TPRG/SEND/NNAP 2 Year Corrected Age Outcome Form (Appendix E), an algorithm was developed, where the bold and non-bold items match those on the 2 year outcomes form for questions 1 (neuromotor), 6 (neurology), 8 (development), 9 (neorosensory) and 10 (communication).

- At least one of the bold* items was marked 'yes' = severe impairment
- At least one of the non-bold items marked yes *and* all bold items marked 'no' = mild-moderate impairment
- All items marked 'no' = no impairment
- Missing data do not count as a 'no', therefore complete data entry is required to identify babies as having no impairment.
- One of the questions on BadgerNet which does not feature on the paper form is "Is development normal (<3 months delay)?" This question was not used to identify babies with no impairment, but if the answer was 'yes' and the other related questions ("Is there mild delay [3-6 months delay]?", "Is there moderate delay [6-12 months delay]?" and "Is there severe delay [>12 months delay]?") were left blank, it was assumed that the answer to these three questions was 'no'.

*The bold items (see Appendix E) were:

- 1.c is this child unable to walk without assistance?
- 1.e is this child unable to sit?
- 1.h is this child unable to use hands (i.e. to feed)?
- 6.c has the child had >1 seizure per month despite treatment?
- 8.c is the child's development >12 months behind corrected age?
- 9.c does this child have hearing impairment not correctable with aids?
- 9.f is this child blind or sees light only?
- 10.c does this child have <5 meaningful words, vocalisations or signs?
- 10.e is the child unable to understand words or signs?

Table 8.2 shows the most severe disability classification recorded across these selected domains (neuromotor, neurology, development, neorosensory and communication) to give an indication of neurodevelopmental impairment. In addition, and separately, respiratory and gastrointestinal morbidities are examined in table 8.3.

Table 8.1

Discharge status of babies born <30⁺⁰ weeks gestation between July 2008 and June 2009 who survived to discharge from neonatal care

Discharge Status	Number of babies <30 ⁺⁰ weeks	As % of all infants <30 ⁺⁰ weeks
Discharged to home, ward or foster care	2978	76%
Died	626	16%
Transferred*	224	6%
Unknown	67	2%

NNAP, infants born 1st July 2008 – 30th June 2009

* Transferred - The last known episode of care ended with a discharge to another hospital for continuing care, cardiac care, specialist care or surgical care. These suggest that they were not the last known episode of neonatal care for the infant, but NNAP has no record of further episodes for these infants within their dataset.

Comment

Nationally, the results from this analysis make disappointing reading with neonatologists recording nothing about the health at the age of two years of 59% of the most preterm babies they had cared for.

There was great variation in the follow up rates between networks. Recorded follow up rates within networks that had more than 50 eligible babies varied between 14% (Lancashire and South Cumbria) and 84% (London North Central). With millions of pounds spent on the immediate postnatal care of this group of babies it is a sad indictment that we know so little about their long term outcomes outside of research studies. These results surely present challenges to commissioners of neonatal and paediatric care across the country. If some networks can achieve follow up rates of >60%, there are opportunities to set CQUINS in other networks in this area.

Table 8.2

Neurodevelopmental outcomes from two year (corrected post term) health follow-up recorded by neonatal network, babies born <30⁺⁰ weeks gestation who survived to discharge from neonatal care between July 2008 and June 2009

Neonatal network of birth	Total eligible babies	Some health data entered				No health data entered			
		Impairment not determinable	No impairment	Mild/moderate impairment	Severe impairment	Lost to follow-up	Died post discharge	Not assessed for other reason	No data entered at all
Bedfordshire and Hertfordshire	118	11	23	9	1	4	.	3	67 (57%)
Cheshire & Merseyside	106	4	16	6	7	4	.	2	67 (63%)
Eastern	206	14	34	12	7	2	.	7	130 (63%)
Greater Manchester	223	19	28	9	15	3	.	2	147 (66%)
In transit to hospital	3	.	.	.	.	.	.	1	2 (67%)
Kent	119	11	33	8	11	9	.	9	38 (32%)
Lancashire and South Cumbria	103	1	9	3	1	.	.	1	88 (85%)
London - North Central	126	10	51	16	16	4	2	9	18 (14%)
London - North East	268	23	50	21	15	8	1	6	144 (54%)
London - North West	220	10	73	16	18	7	1	3	92 (42%)
London - South East	165	21	48	13	19	7	3	10	44 (27%)
London - South West	125	13	21	22	12	8	.	3	46 (37%)
Midlands - Central	11	1	1	.	.	2	.	.	7 (64%)
Midlands - South West	113	12	24	12	10	6	1	5	43 (38%)
North Trent	16	.	.	.	1	.	.	.	15 (94%)
Northern	153	8	18	8	3	.	.	.	116 (76%)
Peninsula - South West	91	4	8	10	2	.	.	.	67 (74%)
South Central (North)	141	3	17	5	3	.	.	.	113 (80%)
South Central (South)	192	15	56	16	13	5	1	3	83 (43%)

Neonatal network of birth	Total eligible babies	Some health data entered				No health data entered			
		Impairment not determinable	No impairment	Mild/moderate impairment	Severe impairment	Lost to follow-up	Died post discharge	Not assessed for other reason	No data entered at all
Staffordshire, Shropshire and Black Country Newborn Network	16	6	2	.	4	.	.	1	3 (19%)
Surrey and Sussex	149	4	25	4	4	.	.	5	107 (72%)
Trent	150	2	24	8	5	2	.	.	109 (73%)
Western	107	11	13	6	3	.	1	6	67 (63%)
Yorkshire	8	.	1	1	.	.	.	.	6 (75%)
Home	18	1	3	1	2	.	1	.	10 (56%)
Non NHS England	15	1	3	1	.	.	.	.	10 (67%)
Unknown*	16	1	1	.	.	.	.	1	13 (81%)
Total	2978	206	582	207	172	71	11	77	1652 (55%)

NNAP, 1st July 2008 – 30th June 2009

* Babies are assigned to “unknown network” if the two year corrected post term health follow-up took place in a community centre, abroad or in a non-NNAP unit.

Table 8.3

Respiratory and Gastro-intestinal outcomes from two year (corrected post term) health follow-up recorded by neonatal network, babies born <30⁺0 weeks gestation who survived to discharge from neonatal care between July 2008 and June 2009

Neonatal network of birth	Eligible babies	Respiratory				Gastro-intestinal				No data entered at all
		Impairment not determinable	No impairment	Mild/moderate disability	Severe disability	Impairment not determinable	No impairment	Mild/moderate disability	Severe disability	
Bedfordshire and Hertfordshire	118	7	34	1	2	8	34	.	2	67 (57%)
Cheshire & Merseyside	106	5	26	1	1	1	32	.	.	67 (63%)
Eastern	206	4	61	1	1	3	58	5	1	130 (63%)
Greater Manchester	223	5	61	4	1	5	60	5	1	147 (66%)
Kent	119	1	60	1	1	2	58	2	1	38 (32%)
Lancashire and South Cumbria	103	1	13	.	.	1	13	.	.	88 (85%)
London - North Central	126	7	83	1	2	5	83	1	4	18 (14%)
London - North East	268	1	108	.	.	4	102	2	1	144 (54%)
London - North West	220	8	105	2	2	9	105	2	1	92 (42%)
London - South East	165	4	96	.	1	7	89	5	.	44 (27%)
London - South West	125	7	58	1	2	7	56	3	2	46 (37%)
Midlands - Central	11	1	1	.	.	1	1	.	.	7 (64%)
Midlands - South West	113	6	52	.	.	5	49	2	2	43 (38%)
North Trent	16	.	1	.	.	.	1	.	.	15 (94%)
Northern	153	.	31	5	1	.	36	.	1	116 (76%)
Peninsula - South West	91	2	21	.	1	3	20	1	.	67 (74%)

Neonatal network of birth	Eligible babies	Respiratory				Gastro-intestinal				No data entered at all
		Impairment not determinable	No impairment	Mild/moderate disability	Severe disability	Impairment not determinable	No impairment	Mild/moderate disability	Severe disability	
South Central (North)	141	1	27	.	.	4	23	1	.	113 (80%)
South Central (South)	192	3	96	1	.	1	94	5	.	83 (43%)
Staffordshire, Shropshire and Black Country Newborn Network	16	2	10	.	.	1	11	.	.	3 (19%)
Surrey and Sussex	149	2	35	.	.	1	34	2	.	107 (72%)
Trent	150	.	39	.	.	.	39	.	.	109 (73%)
Western	107	3	30	.	.	3	29	1	.	67 (63%)
Yorkshire	8	.	2	.	.	1	1	.	.	6 (75%)
Home	18	1	6	.	.	.	7	.	.	10 (56%)
Non NHS England	15	.	5	.	.	.	5	.	.	10 (67%)
Unknown*	16	.	2	.	.	.	2	.	.	13 (81%)
Total	2978	71	1063	18	15	72	1042	37	16	1652 (55%)

* Babies are assigned to "unknown network" if the two year corrected post term health follow-up took place in a community centre, abroad or in a non-NNAP unit.

Question 9

Audit: What percentage of babies admitted to a neonatal unit have:
(a) one or more episodes of a pure growth of a pathogen from blood;
(b) one or more episodes of a pure growth of a pathogen from CSF;
(c) and either a pure growth of a skin commensal or a mixed growth with ≥ 3 clinical signs at the time of blood sampling?

Standard: Standard not set, benchmarking at present.

Source of standard: NNAP Board

Results:

Table 9.1 shows that initially there were **78705** admissions in **163** units eligible for this audit. Only **15%** (11998/78705) of all eligible admissions have had a blood culture recorded as taken through a culture form.

Ad-hoc form data was used in place of the NNAP data fields due to issues with completeness within the NNAP fields. In these circumstances it was felt that representing units only by the number of pure growths they recorded, and not including the number of cultures they recorded, would be unfair. For this reason, the figures below represent data on all recorded cultures, not just records of a pure growth.

There were:

(a) **11998** blood cultures taken of which **74%** (8872/11998) had a blood culture result recorded (i.e. type of pathogen or 'none' for no growth). **3%** (355/11998) had a recognised pure pathogen.

(b) **1271** Cerebrospinal Fluid (CSF) cultures taken of which **78%** (987/1271) had a result recorded (i.e. type of pathogen or 'none' for no growth) of these **1%** (18/1272) had a recognised pure pathogen.

(c) Of the **11998** blood cultures recorded, **0.4%** (52/11998) had a skin commensal with 3 or more clinical signs recorded. There were no cultures with a mixed growth where 3 or more clinical signs were recorded.

The results for individual neonatal units are available in the web-based report. 

Table 9.1

Blood cultures taken by neonatal unit level

Unit Level	Number of admissions	Blood culture samples				
		Number of cultures recorded	Number of culture samples with results recorded (as % of recorded cultures)	Number of pure growths recorded	Number of commensals with 3 or more clinical signs	Number of mixed growths with 3 or more clinical signs
1	12221	1471	894 (61%)	23	0	0
2	33884	4921	3557 (72%)	137	3	0
3	32600	5606	4421 (79%)	195	49	0
Total	78705	11998	8872 (74%)	355	52	0

NNAP, 1st January - 31st December 2011**Table 9.2**

CSF cultures taken by neonatal unit level

Unit Level	Number of admissions	CSF culture samples				
		Number of cultures recorded	Number of culture samples with results recorded	Number of pure growths recorded	Number of commensals with 3 or more clinical signs	Number of mixed growths with 3 or more clinical signs
1	12221	116	74 (64%)	1	0	0
2	33884	499	361 (72%)	6	0	0
3	32600	656	552 (84%)	11	0	0
Total	78705	1271	987 (78%)	18	0	0

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Question 10

Audit: What percentage of babies of more than or equal to 35⁺⁰ weeks gestation have an encephalopathy within the first 3 full calendar days after birth?

Standard: Standard not set, benchmarking at present.

Source of standard: NNAP Board

Results:

The full analysis of this question has been limited this year to those Trusts which sent in denominator data for births by gestation, thus enabling a calculation of an encephalopathy rate per 10,000 live births with gestation $\geq 35^{+0}$ weeks. For this year's analysis we only looked at Grade 3 HIE. From the data available in Badger, this is any baby who has consciousness recorded as "comatose".

Trusts were asked to provide the total number of live births in 2011, and then a breakdown of this figure by gestational age to be used for analyses. In cases where the difference between these two sets of figures was greater than 5% the Trust has been excluded (1 trust). In addition to this, Trust data was only included in cases where gestational age was available specifically for infants born at 35⁺⁰ weeks or later (1 trust excluded). Cases where the denominator provided was judged to be incomplete were also excluded (2 trusts). There were **387695** babies from **84** Trusts of more than or equal to 35⁺⁰ weeks gestation who were included as a denominator for this question.

From 84 Trusts there were 100 units with records for 12181 babies who were eligible for inclusion in the audit and were cared for by a NNAP neonatal unit for the first 3 full calendar days after birth. Of these, **191** babies (**4.9 babies per 10,000 live births** - 191/387695) had a confirmed Grade 3 HIE. **29%** (3562/12181) of babies had no data relating to consciousness entered during the first 3 full calendar days after birth, thus the rates calculated here may represent minimum values for each unit. Those units with apparently higher rates may merely be recording data more completely than others.

Table 10.1 shows data for each NHS Trust, by Trust of birth.

Table 10.1

Grade 3 HIE within the first 3 full days after birth, for babies born $\geq 35^{+0}$ weeks gestation by unit and discharged in 2011. Babies are assigned to place of birth

NHS Trust	Total live births $\geq 35^{+0}$ weeks	Number with Grade 3 HIE	Rate per 10,000 live births
Airedale NHS FT	2403	1	4.2
Ashford and St Peter's Hospitals NHS Trust	3998	0	0
Barking Havering and Redbridge University Trust	9376	5	5.3
Barnsley NHS FT	2936	3	10.2
Barts and the London NHS Trust	4374	3	6.9
Basildon and Thurrock University Hospital FT	4124	5	12.1
Bedford Hospital NHS Trust	3157	2	6.3
Birmingham Women's NHS FT	7172	4	5.6
Blackpool Teaching Hospitals NHS FT	2987	1	3.3
Bolton NHS FT	4727	2	4.2
Bradford Teaching Hospitals NHS FT	5766	4	6.9
Brighton & Sussex University Hospitals NHS Trust	5823	2	3.4
Burton Hospitals NHS FT	3679	1	2.7
Calderdale & Huddersfield NHS FT	5797	1	1.7
Chesterfield Royal Hospital NHS FT	3095	1	3.2
City Hospitals Sunderland	3416	1	2.9
Countess of Chester NHS Trust	3118	1	3.2
Croydon Health Services NHS Trust	4322	2	4.6
Dartford & Gravesham NHS T	4826	2	4.1
Doncaster & Bassetlaw NHS Trust	4812	3	6.2
East Cheshire NHS Trust	1986	0	0
East Kent Hospitals University NHS FT	7096	10	14.1
East Sussex Healthcare Trust	4105	4	9.7
East and North Hertfordshire NHS Trust	5422	0	0
Frimley Park Foundation Trust	5239	4	7.6
George Eliot Hospital NHS Trust	2285	1	4.4
Gloucestershire Hospitals NHS FT	6221	0	0
Guys & St Thomas NHS FT	6691	3	4.5
Harrogate & District NHS FT	2086	0	0
Heart of England Foundation Trust	10406	2	1.9
Heatherwood and Wexham Park NHS FT	5107	11	21.5
Homerton University Hospital NHS FT	4796	3	6.3
Imperial College Healthcare NHS T	4396	2	4.5

NHS Trust	Total live births ≥ 35+0 weeks	Number with Grade 3 HIE	Rate per 10,000 live births
Kings College Hospital Trust	4963	6	12.1
Kingston Hospital NHS Trust	5797	6	10.4
Lancashire Teaching Hospitals NHS FT	4565	0	0
Leeds Teaching Hospitals NHS Trust	9249	4	4.3
Luton & Dunstable Hospital NHS FT	5062	0	0
Medway Hospital NHS FT	4740	2	4.2
Mid Cheshire Hospitals NHS FT	2825	1	3.5
Mid Staffs NHS FT	1788	0	0
Milton Keynes NHS FT	3787	0	0
Newcastle upon Tyne Hospitals NHS FT	6680	0	0
Newham University Hospital Trust	4895	3	6.1
North Tees & Hartlepool NHS FT	3470	3	8.6
North West London Hospitals NHS Trust	4952	4	8.1
Northern Devon Healthcare NHS Trust	1660	2	12
Northern Lincolnshire & Goole Hospitals NHS FT	4451	3	6.7
Nottingham University Hospitals Trust	11258	8	7.1
Pennine Acute Hospitals NHS Trust	10284	4	3.9
Peterborough & Stamford Hospitals NHS FT	4412	3	6.8
Poole Hospital NHS FT	4659	4	8.6
Portsmouth Hospitals NHS Trust	5912	2	3.4
Queen Elizabeth Hospital King's Lynn NHS FT	2279	3	13.2
Rotherham NHS FT	2727	1	3.7
Royal Berkshire FT	5704	2	3.5
Royal Devon & Exeter FT	4104	6	14.6
Royal Surrey County Hospital NHS FT	3246	0	0
Salisbury NHS FT	2471	1	4
Scarborough NHS Trust	1699	1	5.9
Sheffield Teaching Hospitals NHS FT	7007	2	2.9
South Devon Healthcare NHS FT	2516	3	11.9
Southend Hospital NHS Trust	3778	1	2.6
St George's Healthcare Trust	5191	1	1.9
St Helens & Knowsley Teaching Hospital NHS T	3441	0	0
Stockport NHS FT	3691	0	0
Tameside NHS FT	2637	1	3.8
Taunton & Somerset NHS FT	3337	1	3
The Dudley Group NHS FT	5094	8	15.7
The Mid Yorkshire Hospital NHS T	6613	0	0

NHS Trust	Total live births $\geq 35+0$ weeks	Number with Grade 3 HIE	Rate per 10,000 live births
The Royal Wolverhampton NHS T	3984	0	0
UCLH NHS Foundation Trust	5737	8	13.9
United Lincolnshire Hospitals NHS Trust	3779	1	2.6
University Hospital of Leicester NHS Trust	10532	0	0
University Hospital of South Manchester NHS FT	4021	0	0
University Hospitals of Morecambe Bay NHS FT	2353	1	4.2
Warrington & Halton Hospitals NHS FT	2999	0	0
West Hertfordshire Hospitals NHS Trust	5693	3	5.3
West Suffolk Hospital NHS Foundation Trust	2691	1	3.7
Western Sussex NHS Trust	5542	4	7.2
Whipps Cross University Hospitals NHS T	5506	0	0
Wirral University Teaching Hospital NHS FT	3548	1	2.8
Wrightington Wigan & Leigh NHS FT	3006	2	6.7
Wye Valley NHS Trust	1616	0	0
Total	387695	191	4.9

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An analysis of cooling rates for Grade 3 HIEs, and whether any other babies who were not recorded Grade 3 HIE were cooled, is available in the web-based report. [🔗](#)

4 Audit developments in 2011

4.1 Changes to the audit questions

As a result of the recommendations of the Question Review Working Group, two new questions were added to the audit from January 2011:

- i) What percentage of babies admitted to a neonatal unit have:
 - a. One or more episodes of a pure growth of a pathogen from blood
 - b. One or more episodes of a pure growth of a pathogen from CSF
 - c. Either a pure growth of a skin commensal or a mixed growth with ≥ 3 clinical signs at the time of blood sampling?
- ii) What percentage of babies of more than or equal to 35⁺⁰ weeks gestation have an encephalopathy within the first 3 calendar days of birth?

No existing audit questions were discontinued.

4.2 Improved on-line reporting

We gratefully acknowledge the improved reporting facilities provided by Clevermed during 2011. In particular, new episodic downloads became available on the Badger 3 reporting website to help units manage data related to ROP screening and sepsis more easily. Recorded ROP screenings, and infants due a screening, can be checked across several reports, whilst the 'Sepsis summary' report can be used to see a list of recorded cultures within a time period.

Within the Badger 3 website, patient lists, available under the 'Data Quality' tab, continue to provide useful information related to NNAP questions. Particularly useful lists include 'Consultation not within 24 hours', 'Breast milk at discharge', 'Patients due first ROP screen', 'Had 1st ROP screen'.

Functions of the reporting website and patient lists from Badger 3 have both been consolidated in BadgerNet under the 'Patient Lists' tab. Though some of the tables and reports mentioned above are not directly available, the BadgerNet site allows users to build an 'NNAP Data Download' that allows users to see NNAP related data on a patient level. This table contains data that relates to temperature, steroids, ROP, first consultation, cultures and neurological signs.

NNAP data quality issues within both platforms have also undergone some changes. Data quality queries no longer direct users to the NNAP form, but to the other forms, such as the admission and discharge forms, where this data can be entered. This has allowed the NNAP form to become 'read only' and should reduce the confusion around having multiple points of data entry.

4.3 Expansion of the audit

The audit team continued to work towards the goal of 100% participation by neonatal units in England, and by the end of 2011 only two units were not submitting data; both of these units have subsequently started submission in 2012.

4.4 Local action planning and improvements

The purpose of this audit is, like all clinical audits, to lead to and demonstrate improvements in practice. In January 2012 a request was circulated to all contributing units asking for examples of local action planning and improvements arising from participation in the NNAP during 2011. 44 units of the 165 contacted (26.6%) completed and returned the form provided. As in previous years, many examples were provided of measures taken to ensure data quality and completeness were addressed, but more pertinently many units reported instances of local action planning and resulting improvements in their clinical practice.

Examples included changes in practice relating to thermoregulation of infants admitted to the NNU with temperatures less than 36.5°C, initiatives to improve breast feeding rates, and screening of eligible babies for ROP before discharge and within the correct screening “window”.

A selection of the responses received, as well as a list of units which responded, can be found at Appendix F.

5. Future developments

5.1 Quality Improvement – detection and management of outliers

The National Clinical Audit Advisory Group (NCAAG), recently renamed the National Advisory Group on Clinical Audit & Enquiries (NAGCAE), has requested that all national audits move towards identifying outliers and from 2012 the NNAP will be implementing the process outlined in the document “Quality Improvement” (available for download from www.rcpch.ac.uk/nnap) **based on the results in this report** (i.e. reflecting the 2011 results).

In summary, this will involve:

i) Detection of a potential outlier

NNAP will create funnel plots of different outcomes and approach those units whose performance is more than two standard deviations (SDs) from the mean with an ‘alert’ and those more than three SDs with an ‘alarm’. NNAP may also approach units whose performance is more than 2 SDs *above the mean* to check their data.

Some of the measures currently audited may provide a more robust measure of a unit’s performance than others, and these measures will be used for the detection of outliers:

- Measurement of temperature within an hour of birth in babies $\leq 28^{+6}$ weeks
- First ROP screening within one week of the window designated by national guidelines
- Breast milk feeding at discharge home for babies who stay in one unit all the time
- First consultation with parents within 24 hours of the baby’s admission

Funnel plots of the percentage of babies for whom the standard is achieved in each NNU will be created for each of these criteria. Consequently a number of units will fall two SDs below the mean for each criterion as would be expected on a purely statistical basis. As there are 4 measures, individual units will have between 0 and 4 criteria below the 95th CI on the funnel plot of the national mean (which can be interpreted as an approximation of being more than 2 “moving” standard deviations below the national mean. Depending upon the distribution of units under-performing on 0, 1, 2, 3 or 4 standards, NNAP will approach those under-performing on 4 standards, and possibly some underperforming on 3 standards if their performance has raised alarms (below the 99.8th C.I. on the funnel plot, approximately >3 SD below mean) in any of the 4 individual standards. It is therefore NNAP’s expectation that, using this approach, those units with a broad range of difficulties will be recognised and helped first.

Comparison of providers will take account of differences in the mix of patients between units/networks by adjusting for known, measurable factors that are associated with the performance indicator. These will include *as a minimum* - where appropriate - birth weight and gestation, sex and congenital abnormality.

ii) Management of a potential outlier

Management of a potential outlier involves several groups and individuals:

- NNAP: the team responsible for managing and running the audit nationally
- Chair of the NNAP Project Board: person responsible for the audit
- Provider lead clinician: clinician contact for NNAP in provider organisation
- Provider clinical governance lead: responsible for clinical governance in provider. In addition, the provider medical director and chief executive may need to be involved.

iii) Quality Improvement action plans

The NNAP team will contact all unit leads requesting that an action plan be developed in response to the results outlined in the annual report. Neonatal Network Managers & Network Leads will also be contacted to allow network-wide plans to be developed.

Both clinical and managerial staff will be involved in the development of local recommendations and action. It is suggested that the clinical lead and audit lead provide a first draft action plan for discussion at unit level to ensure all are able to contribute to the process and agree on actions to be taken.

NNAP anticipates that it may become appropriate to approach not just those units underperforming on a number of measures, but all units under-performing on any one audit measure in order to drive up performance.

iv) Monitoring change

The responsible individual(s) in each unit formally approached by NNAP should regularly review the action plan to monitor progress. The leads for each action should report to the unit NNAP lead any delays or issues in implementing the recommendations and where necessary agree an alternative solution.

A copy of each unit's action plan will be returned to the NNAP team by the unit's NNAP lead. With the permission of the units in question, examples of good practice will be shared via the NNAP webpage. However, local change will always be a local responsibility. Units will have in place guidance on steps to take when results indicate that change is necessary and has not been implemented. There will be clear and transparent escalation routes e.g. to clinical director, medical director, healthcare governance and finally the board.

The central NNAP team will write to the network manager and clinical lead about any units that have been formally approached but do not submit action plans and updates. The network manager and clinical lead will be asked to comment on the issues involved and to support the unit concerned. If, after 12 months, there is no adequate response, NNAP will write to the Trust's Chief Executive and Medical Director.

5.2 Changes to the audit questions

As a result of the recommendations of the Question Review Working Group, one new question was added to the audit from January 2012:

“How many blood stream infections^a are there on a NNU per 1000 days of central line^b care?”

^a The growth of a recognised pathogen in pure culture, or in the case of a mixed growth, or growth of skin commensal, the added requirement for 3 or more of 10 predefined clinical signs

^b central line = UAC, UVC, percutaneous long line or surgically inserted long line.

The complete list of 2012 audit questions can be found at Appendix G.

A Question Review working group will be working to ensure the alignment of the NNAP audit questions with the NICE Neonatal Care Quality Standards.

5.3 NNAP data fields – Data Entry Guideline

As the BadgerNet system has developed and grown, it has become possible to enter NNAP data items in more than one location, which has led to complications with the analysis of the data. From January 2012 the fields NNAP will include in analysis have been limited; the NNAP form is moving towards being read-only, **and all NNAP data will be derived from the daily data and ad hoc fields.** A NNAP Data Entry Guideline has been produced which outlines the location of each data item the audit will be including; this document will be updated to reflect changes to the BadgerNet and the NNAP audit questions as and when necessary and is available for download from the NNAP web page.

NNAP is aware that not every neonatal unit is using a BadgerNet programme to collect data and apologises that it cannot produce guidelines for each individual system. Nevertheless the guide may still be of some value. We thank the engineers from the software companies for working collaboratively to ensure that all can contribute to the audit.

5.4 NNAP and the National Neonatal Research Database

The Neonatal Data Analysis Unit (NDAU) is developing a National Neonatal Research Database. The National Research Ethics Service and the Ethics and Confidentiality Committee of the National Information Governance Board have approved this to support NHS services and research. In the Spring/Summer of 2012 the NNAP lead and Caldicott Guardian at each Trust will receive an explanatory letter and form of agreement to sign and return to NDAU. This agreement will enable NNAP to access additional information for the audit without returning to Trusts for written permission each time a new question is added or modified, though, of course, NNAP will discuss proposed changes with users and listen to their views.

Watch out for updates from NDAU and visit their website. (www.imperial.ac.uk/nda)

5.5 Development of a Parent Reported Experience Measure (PREM)

It is recognised that capturing the patient/parent experience is an essential part of the assessment of the overall quality of a clinical service. A PREM Working Group has been convened, including representation from Bliss, the national UK charity and parent advocacy organisation, and the Neonatal Networks. Bliss engaged with their well-established parent forums to advise on the outcomes they consider of principal importance, and the Working Group also drew on the results of the report “Parents’ experiences of neonatal care: a report on the findings from a national survey” (November 2011) carried out by the Picker Institute and championed by Bliss. A list of five questions (below) has been drafted to reflect the parent experience, and the Working Group are exploring the most effective methodology for collection of this data, which will be incorporated into the audit by January 2013.

1. When your baby was well enough, did you have as much skin to skin care with your baby as you wanted?
2. Did staff arrange your baby’s care (such as weighing, bathing) to fit in with your usual visiting times?
3. Were you involved as much as you wanted in the day-to-day care of your baby such as nappy changing and feeding?
4. Did the doctors and nurses include you in discussions about your baby’s care and treatment?
5. Were you told about any changes in your baby’s condition or care?

5.6 Collaboration with Clevermed

During 2012 NNAP will approach Clevermed for additional help with the audit:

- To discuss the option of Clevermed creating a parents’ page within BadgerNet. This would contain the PREM questions discussed above. One feature might be that the parent could close the page down after answering the questions so that it could not be opened again on the NNU to maintain a level of confidentiality and anonymity around their comments, and yet still allow a report to be created for groups of babies on a unit – e.g. all ventilated babies, all babies <1000g etc.
- To create a web page allowing each individual unit to view its own raw data as used by NDAU for the annual report analysis, so that units could cross check that data with entries on their own system.

5.7 Expansion of the audit

During 2011, the 13 neonatal units in Wales installed the BadgerNet system and commenced system and data quality testing. All units have committed to the submission of data to NNAP in 2012.

Appendix A: NNAP unit leads

Everyone who works on a NNU can contribute to NNAP but we would particularly like to thank the NNAP unit leads for their hard work and hours of data checking to improve the accuracy and completeness of NNAP data.

Hospital	NNAP unit lead
Airedale General Hospital	Dr Matthew Babirecki
Alexandra Hospital (Redditch)	Dr Andrew Short
Arrowe Park Hospital	Dr Oliver Rackham
Barnet Hospital	Dr Tim Wickham
Barnsley District General Hospital	Dr Mahmood Saeed
Basildon Hospital	Dr Khorshed Khalifa
Basingstoke & North Hampshire Hospital	Dr Ruth Wigfield
Bassetlaw District General Hospital	Dr Henry Mulenga
Bedford Hospital	Dr Raghavan Kadalraja
Birmingham City Hospital	Dr Julie Nycyk
Birmingham Heartlands Hospital	Dr Philip Simmons
Birmingham Women's Hospital	Dr Andrew Ewer
Bradford Royal Infirmary	Dr Sam Oddie
Broomfield Hospital	Dr Admed Hassan
Calderdale Royal Hospital	Ms Kath Barnes
Chase Farm Hospital	Dr Tim Wickham
Chelsea & Westminster Hospital	Dr Shu-Ling Chuang
Chesterfield Royal Hospital	Dr Aiwyne Foo
Colchester General Hospital	Dr Sarah Dalton
Conquest Hospital	Dr Graham Whincup
Countess of Chester Hospital	Dr Stephen Brearey
Croydon University Hospital	Dr John Chang
Cumberland Infirmary	Dr John Storr
Darent Valley Hospital	Dr Selywn D'Costa
Darlington Memorial Hospital	Ms Janice Ratcliffe
Derriford Hospital	Dr Alex Allwood
Dewsbury & District Hospital	Dr Peter Mackay
Diana Princess of Wales Hospital (Grimsby)	Dr Pauline Adiotomre
Doncaster Royal Infirmary	Dr Sayed Ahmad
Dorset County Hospital	Dr Phil Wylie
Ealing Hospital	Dr Vivien Chan
East Surrey Hospital	Dr Nasser Al-Hilaly
Eastbourne District General Hospital	Dr Imad Boles
Epsom General Hospital	Dr Maria Garcia
Fairfield General Hospital	Dr Ruth Wakefield
Friarage Hospital	Dr Ruth Roberts
Frimley Park Hospital	Dr Abdus Mallik
Furness General Hospital	Dr Anas Olabi
George Eliot Hospital	Dr Richard de Boer

Gloucestershire Royal Hospital	Dr Jennifer Holman
Good Hope Hospital	Ms Sheena Lewis
Great Western Hospital	Dr Stanley Zengeya
Guy's & St Thomas' Hospital	Dr Karen Turnock
Harrogate District Hospital	Dr Shakeel Rahman
Hereford County Hospital	Dr Helen Underhill
Hillingdon Hospital	Dr Michele Cruwys
Hinchingbrooke Hospital	Dr Hilary Dixon
Homerton Hospital	Dr Olga Kapellou
Horton Hospital	Dr Naveen Shettihalli
Hull Royal Infirmary	Dr Chris Wood
Ipswich Hospital	Dr Matthew James
James Cook University Hospital	Dr Mithilesh Lal
James Paget Hospital	Dr Vasantha Jayalal
John Radcliffe Hospital	Prof Andrew Wilkinson
Kettering General Hospital	Dr Harsha Bilolikar
King George Hospital	Dr Balkrishna Sharma
King's College Hospital	Dr Abhi Lall
King's Mill Hospital	Dr Vibert Noble
Kingston Hospital	Dr Vinayak Pai
Lancashire Women and Newborn Centre, Burnley	Dr Meera Lama
Leeds General Infirmary	Dr Bryan Gill
Leeds Neonatal Service	Dr Lawrence Miall
Leicester General Hospital	Dr Venkatesh Kairamkonda
Leicester Royal Infirmary	Prof David Field
Leighton Hospital	Dr A Thirumurugan
Lincoln County Hospital	Dr Sudhakar Rao
Lister Hospital (Stevenage)	Dr Andy Raffles
Liverpool Women's Hospital	Dr Hafis Ibrahim
Luton & Dunstable Hospital	Dr Satishkumar Somisetty
Macclesfield District General Hospital	Dr Gail Whitehead
Maidstone General Hospital	Dr Hamudi Kisat
Manor Hospital	Dr Bangalore Satish
Medway Maritime Hospital	Dr Ghadda Ramadan
Milton Keynes Foundation Trust Hospital	Dr Jasper Katumba
New Cross Hospital	Ms Bernie Williams
Newham General Hospital	Dr Vimala Gopinathan
Norfolk & Norwich University Hospital	Dr David Booth
North Bristol Trust (Southmead)	Dr David Evans
North Devon District Hospital	Dr Yonas Cherinet
North Manchester General Hospital	Dr Nagesh Panasa
North Middlesex University Hospital	Dr Lesley Alsford
Northampton General Hospital	Dr Fiona Thompson
Northwick Park Hospital	Dr Christina Philipp
Nottingham City Hospital	Dr Lleona Lee
Nottingham University Hospital	Dr Stephen Wardle

Ormskirk District General Hospital	Dr Tim McBride
Peterborough City Hospital	Dr Seif Babiker
Pilgrim Hospital	Dr Surya Hanumara
Pinderfields General Hospital	Dr Kallinath Shyamanur
Poole Hospital NHS Foundation Trust	Dr Minesh Khashu
Princess Alexandra Hospital	Dr Than Soe
Princess Anne Hospital	Dr Mike Hall
Princess Royal Hospital (Haywards Heath)	Dr Philip Amess
Princess Royal University Hospital	Dr Shaun Walter
Queen Alexandra Hospital	Dr Huw Jones
Queen Charlotte's Hospital	Dr Lidia Tyszczuk
Queen Elizabeth Hospital (Woolwich)	Dr Olutoyin Banjoko
Queen Elizabeth Hospital (King's Lynn)	Dr Susan Rubin
Queen Elizabeth Hospital (Gateshead)	Dr Anne Dale
Queen Elizabeth II Hospital	Dr Andy Raffles
Queen Elizabeth the Queen Mother Hospital	Dr Mohsin Malik
Queen's Hospital (Romford)	Dr Raghavan Prasad
Queen's Hospital (Burton-on-Trent)	Dr Azhar Manzoor
Rochdale Infirmary	Dr Pervais Mir
Rosie Maternity Hospital	Dr Anna Curley
Rotherham District General Hospital	Dr Christine Harrison
Royal Albert Edward Infirmary	Dr Christos Zipitis
Royal Berkshire Hospital	Dr Greg Boden
Royal Bolton Hospital	Ms Cath Turner
Royal Cornwall Hospital	Dr Pau Munyard
Royal Derby Hospital	Ratnayaka
Royal Devon & Exeter Hospital	Dr Vaughan Lewis
Royal Hampshire County Hospital	Dr Simon Struthers
Royal Lancaster Infirmary	Do Jo Fedee
Royal Oldham Hospital	Dr Natasha Maddock
Royal Preston Hospital	Dr Richa Gupta
Royal Shrewsbury Hospital	Dr Alison Moore
Royal Surrey County Hospital	Ms Jane James
Royal Sussex County Hospital	Dr Philip Amess
Royal United Hospital (Bath)	Dr Steve Jones
Royal Victoria Infirmary (Newcastle upon Tyne)	Dr Alan Fenton
Russells Hall Hospital	Dr Anande Mohite
Salford Royal Foundation Trust	Dr Michael Robinson
Salisbury District Hospital	Dr Shirley Kinsey
Sandwell General Hospital	Dr Penelope Broggio
Scarborough General Hospital	Dr Mazen Qunibi
Scunthorpe General Hospital	Dr James Devlin
Sheffield Children's Hospital	Dr Jenny Walker
South Tyneside District Hospital	Dr Rob Bolton
Southend Hospital	Ms Maureen Flynn
St George's Hospital (Tooting)	Dr Sandra Calvert

St Helier Hospital	Dr Ruth Shephard
St Mary's Hospital (Paddington)	Dr Peter Chow
St Mary's Hospital (Manchester)	Dr Minju Kuruvilla
St Mary's Hospital (Isle of Wight)	Dr Sian Butterworth
St Michael's Hospital (Bristol)	Dr Pamela Cairns
St Peter's Hospital (Chertsey)	Dr Peter Reynolds
St Richard's Hospital (Chichester)	Dr Timothy Taylor
Staffordshire General Hospital	Mrs Gina Hartwell
Stepping Hill Hospital	Dr Carrie Heal
Stoke Mandeville Hospital	Dr Sanjay Salgia
Sunderland Royal Hospital	Dr Geoffrey Lawson
Tameside General Hospital	Dr Jacqueline Birch
Taunton & Somerset Hospital	Dr Rebecca Mann
The Jessop Wing	Dr Alan Gibson
The Royal Free Hospital	Dr Vivienne van Someren
The Royal London Hospital	Dr Rainer Ebel
Torbay Hospital	Dr Mala Raman
Trafford General Hospital	Dr Dorothy Ridgway
Tunbridge Wells Hospital	Dr Hamudi Kisat
University College Hospital	Dr Mark Sellwood
University Hospital Coventry	Dr Kate Blake
University Hospital Lewisham	Dr Jauro Kuna
University Hospital of Hartlepool	Dr Anil Gupta
University Hospital of North Durham	Ms Jan Klinke
University Hospital of North Staffordshire	Dr Kate Palmer
University Hospital of North Tees	Dr Bernd Reichert
University Hospital of South Manchester	Dr Faisal Al-Zidgali
Victoria Hospital (Blackpool)	Dr Chris Rawlingson
Wansbeck General Hospital	Ms Joan Oliver
Warrington Hospital	Dr Delyth Webb
Warwick Hospital	Dr Ashoka Acharya
Watford General Hospital	Dr Emmanuel Quist-Therson
West Cumberland Hospital	Dr Mahfud Ben-Hamida
West Middlesex University Hospital	Dr Hashir Ariff
West Suffolk Hospital	Dr Ian Evans
Wexham Park Hospital	Dr Rekha Sanghavi
Whipps Cross University Hospital	Dr Caroline Sullivan
Whiston Hospital	Dr Laweh Amegavie
Whittington Hospital	Dr Raoul Blumberg
William Harvey Hospital	Dr David Long
Worcestershire Royal Hospital	Dr Andrew Gallagher
Worthing Hospital	Dr Anil Garg
Yeovil District Hospital	Dr Megan Eaton
York District Hospital	Dr Guy Millman

Appendix B: 2011 Audit Dataset

Data field	Comment
Admission: Temperature at first hour after birth	
Baby: Badger Patient Anonymised ID	BadgerID as can be seen by units within Badger3/Badgernet
Baby: Birth order	Used to identify unique infants where mothers NHS number is missing
Baby: Birth weight (g)	
Baby: Date and time of birth	Provided as year and month of birth only
Baby: Date of Birth	Provided as year and month of birth only
Baby: Date of death	Provided as year and month of discharge only
Baby: Final neonatal unit outcome	
Baby: Gestation at birth in weeks	
Baby: Gestational age in days	
Baby: Location of birth	NDAU coded
Baby: NHS Number	Encrypted
Mother: NHS Number	Encrypted
Mother: Hospital of intended place of delivery	NHS and NDAU coded
Mother: Steroids antenatal, was this given?	
Mother: Steroids, number of antenatal steroid courses given	
Mother: Total births this pregnancy	Used to identify unique infants where mothers NHS number is missing
General Information: Date of day of care	Provided in minutes from birth
General Information: Level of care (HRG definition)	Used to identify infants receiving higher levels of neonatal care
General Information: Location of care	Used to identify infants receiving higher levels of neonatal care
Neurology: Consciousness	
Neurology: Convulsions	
Neurology: Therapeutic hypothermia	
Neurology: Tone	
ROP: Retinopathy of Prematurity screen	
Transfusions: Full exchange transfusion	Not used in analysis
Admission: Date and time	Provided in minutes from birth
Admission: Hospital admitted from	Provided as NHS and NDAU code
Admission: Hospital of care	Provided as NHS and NDAU code
Admission: Parents seen by senior staff member after admission (yes/no/unknown)	
Admission: Parents seen by senior staff member after admission (date and time)	
Admission: Primary clinical reason	Not used in analysis

Admission: Primary reason	Not used in analysis
Admission: Principle diagnosis at admission	Not used in analysis
Admission: Temperature	Valid range 25-42 values ≥ 77.7 = temp not recordable
Admission: Weight	
Date of event (e.g. Cranial USS, Hearing test, ROP Screening, NEC, Vaccination, Infection)	
Discharge: Date and time	Provided in minutes from birth
Discharge: Destination	Provided as
Discharge: Destination hospital	Provided as NHS code
Discharge: Did baby receive own mothers milk?	Not used in analysis
Discharge: Enteral feeding	
Discharge: Hospital baby admitted to	
Discharge: Milk type	
Discharge: Oxygen	
Discharge: Reason for transfer out	
Discharge: Unit responsible for 2 year follow up	
Infection: Date of sample taken	
Infection: Clinical signs present on day of culture sample	
Infection: Culture sample bacterial sensitivity	
Infection: Result of culture	
Infection: Type of culture sample taken	
This episode of care: Baby received screening for retinopathy	
This episode of care: Date of first Retinopathy Screen	
This episode of care: Hospital of event	
Date of Death	
Other: 2 Year outcomes(separate table)	Items used to determine if infants were followed up, and disability where health data was entered

Appendix C: Categories of Care

Neonatal intensive care units provide specialist care for preterm, low-birth-weight and ill newborn babies. Neonatal care is given in most district general hospitals in special care baby units or neonatal intensive care units. It is a requirement that all maternity units be able to provide facilities for resuscitating unexpectedly ill newborn infants.

The categories of neonatal units are defined as:

Level 1 (Local Special Care Service): Units providing Special Care but not aiming to provide any significant continuing High Dependency or Intensive Care.

Level 2 (Local Neonatal Service): Units provide High Dependency Care and some short-term Intensive Care as agreed within the network.

Level 3 (Neonatal Intensive Care Service): Units provide the whole range of medical neonatal care but not necessarily all specialist services such as neonatal surgery or cardiology.

Categories of Care

These are the BAPM Categories of Care, August 2011.

INTENSIVE CARE

General principle

This is care provided for babies who are the most unwell or unstable and have the greatest needs in relation to staff skills and staff to patient ratios.

Definition of Intensive Care Day

- Any day where a baby receives any form of mechanical respiratory support via a tracheal tube
- **BOTH** non-invasive ventilation (e.g. nasal CPAP, SIPAP, BIPAP, vapotherm) and PN
- Day of surgery (including laser therapy for ROP)
- Day of death
- Any day receiving any of the following:
 - Presence of an umbilical arterial line
 - Presence of an umbilical venous line
 - Presence of a peripheral arterial line
 - Insulin infusion
 - Presence of a chest drain
 - Exchange transfusion
 - Therapeutic hypothermia
 - Prostaglandin infusion
 - Presence of repleg tube
 - Presence of epidural catheter
 - Presence of silo for gastroschisis
 - Presence of external ventricular drain
 - Dialysis (any type)

HIGH DEPENDENCY CARE

General principle

This is care provided for babies who require highly skilled staff but where the ratio of nurse to patient is less than intensive care.

Definition of High Dependency Care Day

Any day where a baby does not fulfil the criteria for intensive care where any of the following apply:

- Any day where a baby receives any form of non invasive respiratory support (e.g. nasal CPAP, SIPAP, BIPAP, HHFNC)
- Any day receiving any of the following:
 - parenteral nutrition
 - continuous infusion of drugs (except prostaglandin &/or insulin)
 - presence of a central venous or long line (PICC)
 - presence of a tracheostomy
 - presence of a urethral or suprapubic catheter
 - BAPM - Categories of Care August 2011
 - presence of trans-anastomotic tube following oesophageal atresia
 - repair
 - presence of NP airway/nasal stent
 - observation of seizures/CF monitoring
 - barrier nursing
 - ventricular tap

SPECIAL CARE

General principle

Special care is provided for babies who require additional care delivered by the neonatal service but do not require either Intensive or High Dependency care.

Definition of Special Care Day

- Any day where a baby does not fulfill the criteria for intensive or high dependency care and requires any of the following:
 - oxygen by nasal cannula
 - feeding by nasogastric, jejunal tube or gastrostomy
 - continuous physiological monitoring (excluding apnoea monitors only)
 - care of a stoma
 - presence of IV cannula
 - baby receiving phototherapy
 - special observation of physiological variables at least 4 hourly

TRANSITIONAL CARE

General principle

Transitional care can be delivered in two service models, within a dedicated

transitional care ward or within a postnatal ward. In either case the mother **must be resident with her baby and providing care**. Care above that needed normally is provided by the mother with support from a midwife/healthcare professional who needs no specialist neonatal training. Examples include low birth-weight babies, babies who are on a stable reducing programme of opiate withdrawal for Neonatal Abstinence Syndrome and babies requiring a specific treatment that can be administered on a post-natal ward, such as antibiotics or phototherapy.

Appendix D: Participating Units

Units represented in this report by less than 12 months complete data are indicated by an asterisk (*).

Institution	Unit Level	NHS Code	Completed episodes of care	Distinct babies
Airedale General Hospital	2	RCF22	237	221
Alexandra Hospital	1	RNZ23	181	165
Arrowe Park Hospital	3	RBL14	355	342
Barnet Hospital	2	RAL26	438	406
Barnsley District General Hospital	2	RFRAA	285	255
Basildon Hospital	2	RAJ12	388	343
Basingstoke & North Hampshire Hospital	2	RN506	297	276
Bassetlaw District General Hospital	1	RHAAA	163	143
Bedford Hospital	1	RC110	311	282
Birmingham Heartlands Hospital	3	RR101	970	911
Birmingham Women's Hospital	3	RLU01	1281	1233
Bradford Royal Infirmary	3	RAE02	794	748
Broomfield Hospital	1	RRDAA	534	503
Calderdale Royal Hospital	2	RWY02	477	449
Chase Farm Hospital	1	RNLC7	235	219
Chelsea & Westminster Hospital	3	RQM01	620	577
Chesterfield & North Derbyshire Royal	2	RFSDA	288	276
City Hospital, Birmingham	2	RXK02	847	818
Colchester General Hospital	2	RDEE4	427	399
Conquest Hospital	1	RXC01	156	146
Countess of Chester Hospital	2	RJR05	497	469
Croydon University Hospital	2	RJ611	481	460
Darent Valley Hospital	1	RN707	536	496
Darlington Memorial Hospital	1	RTRDA	210	195
Derriford Hospital	3	RK950	1190	1149
Dewsbury & District Hospital	1	RXF10	294	261
Diana Princess of Wales Hospital	2	RJL30	734	717
Doncaster Royal Infirmary	2	RHQDR	302	288
Dorset County Hospital	2	RBD01	266	257
Ealing Hospital	1	RC368	294	280
East Surrey Hospital	2	RTP04	454	435
Eastbourne District General Hospital	1	RXC02	267	238
Epsom General Hospital	1	RVR50	202	188
Fairfield General Hospital	2	RT201	234	228
Frimley Park Hospital	1	RDU01	497	472
Furness General Hospital	1	RTXBU	123	107

Institution	Unit Level	NHS Code	Completed episodes of care	Distinct babies
George Eliot Hospital	1	RLT01	228	209
Gloucestershire Royal Hospital	2	RTE03	498	459
Good Hope Hospital	1	RJH01	483	438
Great Western Hospital	2	RN325	353	324
Guy's & St Thomas' Hospital	3	RJ100	722	695
Harrogate District Hospital	1	RCD01	187	175
Hereford County Hospital	1	RTE83	232	212
Hillingdon Hospital	2	RAS01	409	382
Hinchingbrooke Hospital	1	RQQ31	215	202
Homerton Hospital	3	RQXM1	680	626
Horton Hospital	1	RTH05	209	192
Hull Royal Infirmary	3	RWA01	516	492
Ipswich Hospital	2	RGQ02	546	505
James Cook University Hospital ¹	3	RTRAT	442	424
James Paget Hospital	1	RGP75	293	280
John Radcliffe Hospital	3	RTH08	826	801
Kettering General Hospital	2	RNQ51	415	399
King George Hospital	1	RF4DG	362	354
King's College Hospital	3	RJ250	653	642
King's Mill Hospital	2	RK5BC	437	424
Kingston Hospital	2	RQY57	448	426
Lancashire Women & Newborn Centre	3	XXX111	535	507
Leeds Neonatal Service	3	RR801	1600	1556
Leighton Hospital	2	RBT20	292	283
Lincoln County Hospital	2	RJL50	423	392
Lister Hospital	2	RWH01	567	550
Luton & Dunstable Hospital	3	RC971	834	791
Macclesfield District General Hospital	2	RJN71	151	136
Maidstone General Hospital [*]	1	RPA27	191	182
Manor Hospital	2	RBK02	454	416
Medway Maritime Hospital	3	RVVMD	881	847
Milton Keynes Foundation Trust Hospital	2	RD816	299	286
New Cross Hospital	3	RL403	559	544
Newham General Hospital	2	RNHB1	486	427
Norfolk & Norwich University Hospital	3	RM102	856	838
North Devon District Hospital	1	RBZ12	275	254
North Manchester General Hospital	1	RW602	375	342
North Middlesex University Hospital	2	RAPNM	334	290
Northwick Park Hospital	2	RV383	605	568
Nottingham City Hospital	3	RCSLB	584	544
Nottingham University Hospital (QMC)	3	RTG09	690	657
Ormskirk District General Hospital	2	RVY02	316	305

Institution	Unit Level	NHS Code	Completed episodes of care	Distinct babies
Peterborough City Hospital	2	RGN66	821	781
Pilgrim Hospital	1	RWD2W	366	340
Pinderfields General Hospital	2	RGD08	385	352
Poole General Hospital	2	RD300	329	303
Princess Alexandra Hospital	2	RQWGO	375	351
Princess Anne Hospital	3	RHM12	823	796
Princess Royal Hospital	1	RWA02	232	210
Princess Royal University Hospital	1	RG303	342	319
Queen Alexandra Hospital	3	RHU03	525	496
Queen Charlotte's Hospital	3	RQN03	455	432
Queen Elizabeth II Hospital*	1	RWH20	269	260
Queen Elizabeth Hospital, Gateshead	1	RR7EN	204	190
Queen Elizabeth Hospital, King's Lynn	2	RCX70	368	348
Queen Elizabeth Hospital, Woolwich	2	RG222	410	381
Queen Elizabeth the Queen Mother Hospital	1	RVV11	239	225
Queen's Hospital, Burton on Trent*	1	RJF02	217	208
Queen's Hospital, Romford	2	RF4QH	799	752
Rochdale Infirmary*	2	RT204	97	87
Rosie Maternity Hospital, Addenbrookes	3	RGT01	915	879
Rotherham District General Hospital	2	RFRPA	261	242
Royal Albert Edward Infirmary	2	RRF02	285	272
Royal Berkshire Hospital	2	RHW01	456	411
Royal Bolton Hospital	3	RMC01	427	408
Royal Cornwall Hospital	2	REF12	600	580
Royal Derby Hospital	2	RTGFG	353	325
Royal Devon & Exeter Hospital	2	RH801	748	711
Royal Hampshire County Hospital	2	RN101	294	282
Royal Lancaster Infirmary	2	RTX02	160	150
Royal Oldham Hospital	2	RT203	407	376
Royal Preston Hospital	3	RXN02	452	425
Royal Shrewsbury Hospital	2	RXWAS	768	761
Royal Surrey County Hospital	1	RA201	327	304
Royal Sussex County Hospital	3	RXH01	496	473
Royal United Hospital	2	RD130	637	599
Royal Victoria Infirmary	3	RTD02	627	585
Russells Hall Hospital	2	RNA01	500	485
Salford Royal Hospital*	3	RM301	312	301
Salisbury District Hospital	2	RNZ02	205	190
Scarborough General Hospital	1	RCC25	229	207
Scunthorpe General Hospital	2	RJL32	590	554

Institution	Unit Level	NHS Code	Completed episodes of care	Distinct babies
South Tyneside District Hospital	1	RE9GA	128	121
Southend Hospital	2	RAJ01	292	269
Southmead Hospital	3	RVJH4	2704	2339
St George's Hospital	3	RJ701	592	573
St Helier Hospital	2	RVR05	570	540
St Mary's Hospital, IOW	2	RR201	264	256
St Mary's Hospital, London	2	RV3CP	387	377
St Mary's Hospital, Manchester	3	RW3SM	774	750
St Michael's Hospital	3	RA707	2522	2449
St Peter's Hospital	3	RTK01	760	741
St Richard's Hospital	2	RPR01	746	720
Staffordshire General Hospital	1	RRE01	183	176
Stepping Hill Hospital	2	RWJ01	269	252
Stoke Mandeville Hospital	2	RXQ02	435	407
Sunderland Royal Hospital	3	RLNGL	357	334
Tameside General Hospital	2	RMP01	263	246
Taunton & Somerset Hospital	2	RBA11	466	446
The Jessop Wing, Sheffield	3	RHQPH	790	767
The Royal Free Hospital	1	RAL01	341	326
The Royal London Hospital - Constance Green	3	RNJ00	141	118
The Royal London Hospital - Elizabeth Ward	3	RNJ12	590	560
Torbay Hospital	1	RA901	359	318
Tunbridge Wells Hospital	2	RWF01	424	409
University College Hospital	3	RRV11	708	649
University Hospital Coventry	3	RKB01	600	580
University Hospital Lewisham	2	RJ224	426	414
University Hospital of North Durham	1	RXPCP	218	198
University Hospital of North Staffordshire	3	RJEHQ	442	425
University Hospital of North Tees	3	RTRNT	314	301
University Hospital of South Manchester	3	RM202	330	306
Victoria Hospital, Blackpool	2	RXL01	293	280
Wansbeck General Hospital	2	RTDAA	379	356
Warrington Hospital	2	RWWWH	337	316
Warwick Hospital	1	RJC02	386	358
Watford General Hospital	2	RWG02	1037	994
West Middlesex University Hospital	1	RFW01	413	379
West Suffolk Hospital	1	RGR50	418	389
Wexham Park Hospital	2	RD750	504	485
Whipps Cross University Hospital	2	RGCKH	405	376
Whiston Hospital	2	RBN01	302	281

Institution	Unit Level	NHS Code	Completed episodes of care	Distinct babies
Whittington Hospital	2	RKEQ4	1965	1927
William Harvey Hospital	3	RWF37	370	349
Worcestershire Royal Hospital	2	RWP50	582	562
Worthing Hospital	1	RPL04	335	312
Yeovil District Hospital	1	RA430	182	169

¹ James Cook University Hospital data includes that of Friarage Hospital

APPENDIX E: TRPG/SEND/NNAP 2-YEAR CORRECTED AGE OUTCOME FORM

Name & Designation of person completing form _____

Hospital of Birth _____

Infant's name _____ Infant's NHS No _____

Date of Birth ____/____/____ Date of assessment ____/____/____

Gestation at birth (completed weeks) _____ Sex: Male / Female

Reason if child not assessed: Deceased post discharge / lost to follow up _____

Full Current Post Code _____ Date of death if applicable ____/____/____

Birth weight _____ Current hospital of follow up: _____

1.	Neuromotor:		No	Yes	Don't Know
	a. Does this child have any difficulty walking?				
	b. Is this child's gait non-fluent or abnormal reducing mobility?				
	c. Is this child unable to walk without assistance?				
	d. Is this child unstable or needs to be supported when sitting?				
	e. Is this child unable to sit?				
	f. Does this child have any difficulty with the use of one hand?				
	g. Does this child have difficulty with the use of both hands?				
	h. Is this child unable to use hands (i.e. to feed)?				
2.	Malformations:				
	a. Does this child have a malformation identified at birth/ within the first 2yrs?				
	b. Does this malformation impair daily activities despite assistance?				
3.	Respiratory & CVS system:				
	a. Does this child have limited exercise tolerance with or without treatment?				
	b. Does child require supplemental O₂/other respiratory support				
4.	Gastro-intestinal Tract:				
	a. Is this child on a special diet? If yes, what diet: _____				
	b. Does this child have a stoma?				
	c. Does this child require TPN, NG or PEG feeding?				
5.	Renal:				
	a. Does this child have renal impairment, no treatment?				
	b. Is this child on dietary or drug treatment for renal impairment?				
	c. Is this child having renal dialysis/awaiting renal transplant?				

PLEASE DO NOT COMPLETE THIS FORM IF THE CHILD IS ACUTELY ILL

6.	Neurology:	No	Yes	Don't know
	a. Has this child had a fit or seizure in the past 12 months?			
	b. Is this child on any anticonvulsants?			
	c. Has this child had more than 1 seizures a month despite treatment?			
	d. Has this child ever had ventriculo-peritoneal shunt inserted?			
7.	Growth: Give date of measurements if different from date of assessment _____			
	Weight _____ kg Date _____			
	Length _____ cm Date _____			
	Head circumference _____ cm Date _____			
8.	Development	No	Yes	Don't Know
	a. Is the child's development between 3-6 months behind corrected age?			
	b. Is the child's development between 6-12 months behind corrected age?			
	c. Is the child's development > 12 months behind corrected age?			
	d. Will you be referring the child for a detailed neurodevelopmental assessment?			
	e. If child had detailed neurodevelopmental assessment, provide name of the test: _____			
9.	Neurosensory:			
	a. Does this child have a hearing impairment?			
	b. Does this child have hearing impairment corrected by aids?			
	c. Does this child have hearing impairment not correctable with aids?			
	d. Does this child have any visual problems (including squint)?			
	e. Does this child have visual defect that is not fully correctable?			
	f. Is this child blind or sees light only?			
10.	Communication			
	a. Does this child have any difficulty with communication?			
	b. Does this child have difficulty with speech (<10 words/signs)?			
	c. Does the child have <5 meaningful words, vocalisations or signs?			
	d. Does this child have difficulty with understanding outside of familiar context?			
	e. Is this child unable to understand words or signs?			
	Special Questions:			
	a. Is this child on at-risk register, fostered or adopted?			
	b. Was this child difficult to test? If yes, circle appropriate below: (a) tired, (b) poor attention, (c) difficult to engage, (d) other			

Appendix F: Examples of Local Action Planning and Improvements 2011

National Neonatal Audit Programme: Local Action Planning and Improvements resulting from participation in the NNAP in 2011 as reported by units – some examples	
General	
Devise a transfer form to include temperature and observations and communications with parents for babies transferred from Central Delivery Suite to the NICU Allocation of long-stay patients to Junior Doctors so they can follow up the patients through their patient journey. Each junior doctor will be responsible for updating Badger data during the patient stay Need for Transitional Care Facility to avoid separation of mothers and babies, support mothers to breast feed, improve quality of care and promote earlier discharge; six bedded unit due to open April 2012 Daily and weekly review of Badger data by designated ward clerk and senior nursing staff, in particular confirming completion of NNAP fields. Monthly formal meetings involving medical and nursing staff representation along with IT to address robust data collection and completion A red stamp is put on the front page of all admissions to remind staff about 1) consultation with parents and 2) support for breastfeeding In view of poor results across the Trust, plan to undertake three-monthly retrospective audits to monitor progress and assess if this is poor practice or poor documentation. Alternative database searches will be used to assist in answering this question	
Issue	Details of action planning
Temperature	
Temperature of eligible babies not taken within an hour	Review the individual notes of babies ≤ 28 weeks gestation who did not have their temperature taken within the first hour of admission Upon identification of an instance of failure to record temperature of babies ≤ 28 weeks within an hour of birth, Ward Data Entry Clerk to notify Ward Manager for investigation and follow up action
Infants admitted to the NNU with temperatures $< 36.5^{\circ}\text{C}$	Ongoing close liaison and reporting of hypothermic infants to colleagues in the midwifery team. Teaching session on thermoregulation and risk of hypothermia delivered by NNU Practice Educator at Midwifery annual one-stop study day. All student nurses and midwives on placement on NNU receive teaching session on thermoregulation. Hypothermia care bundle put in place on Delivery Suite

	Retrospective audit of admission temperatures to include source of admission (labour ward, theatre, post-natal ward, A&E etc), time from delivery to SCBU admission, use of plastic bag in preterm birth, staff involved. Review and validation of thermometers used in ward practice. Agreement from management regarding ensuring higher baseline thermostatic temperatures in labour ward We are currently in the process of introducing our own “Golden Hour” guideline which addresses the care of preterm babies immediately after birth. One of the changes we are making is that babies will be transferred to the NNU in an incubator rather than on a platform and this should help improve admission temperatures Incident form completed for each cold baby and root cause analysis carried out. Cot warmers and overhead heaters for maternity Possibly due to colleagues delivering baby in amniotic sac; this was making resuscitaire and towels wet when extracting the baby. Despite plastic bags and transwarmers, babies were getting cold. This has been discussed and practice altered; a re-audit is in progress
Steroids	
Steroids data missing Apparently low rate of admission of antenatal steroids	Upon identification of cases where there is no record of steroids having been given to a mother who delivers between 24 and 34 weeks, Ward Data Entry Clerk to notify Midwifery Risk Lead for investigation and follow up action Have implemented midwives inputting steroid data on the information sheet brought round with babies from delivery Obstetric and Gynaecology Dept to undertake an audit on this topic Internal audit needed. Identify interested junior to undertake retrospective audit, review Badger recording of antenatal steroids against maternal notes, compare maternal notes against antenatal steroids guidelines, determine where improvement needed – administration of steroids or recording on Badger?
Receipt of mother's milk	
Lower than expected numbers of infants <33 ⁺⁰ weeks gestation receiving maternal milk at discharge from NNU	Improved breastfeeding teaching to all staff and provision of more time to breastfeeding lead nursing staff on SCBU have led to improved rates

	All staff attending breast feeding training through the baby friendly initiative Establish contact with a local Unit that has performed well in breast feeding at discharge Network data manager developed a 3-month rolling graph of breast milk, formula milk and tube feeding for each unit and these are circulated to teams. Best Beginnings and HIEC breast feeding initiative coincided with this, and improvements in rates of breast milk initiation and continuation have been seen Trust signed up to Breast Feeding Initiative, Lactation Consultant in post and Domperidone used in mothers postnatally to help promote lactation
Parental consultation	
Low number of parents reported as having been seen by a senior member of the neonatal team within 24 hours of admission	Separate parental communication sheet documentation in the medical records with subsequent improvement in data capture Update nursing admission sheet to include a reminder to offer all parents an appointment with a senior paediatrician within 24 hours of admission Awareness of the need to communicate swiftly and frequently with parents of all babies admitted to the unit has been raised amongst medical and nursing staff. All case notes now contain a green parent communication sheet where this is recorded. This ensures that information regarding communication with parents can be easily accessed and used for future communication. Work is ongoing to increase medical presence on the unit to make it easier for parents to access doctors Percentage of parents spoken to displayed on a "high visibility" wall Improvement project to improve recording of first senior consultation – practice agreed (sticker recording consultation available and to be placed on admission sheet), daily monitoring and feedback to seniors needed to embed sticker practice, identify lead for improvement project to carry out this monitoring and feedback Postnatal ward STs to inform middle grades of any weekend transitional care admissions and middle grade to counsel within 24 hours
Retinopathy of Prematurity	
ROP data missing for eligible babies	ROP follow-up column added to the special care sister's diary. Junior doctors to ensure that all babies who need ROP follow-up have this documented in their discharge summary

	Babies who are discharged before their due date for ROP will be screened early. This plan has been discussed and agreed with Ophthalmologists and included as part of discharge checklist. A set day a week has been agreed to review and enter the data on Badger Participation in ROP data entry by consultant ophthalmologist Monday review of care to ensure ROP screening is booked appropriately ROP register (book) to be introduced to SCBU Include question about ROP screening on next revision of admission document with date of referral and date screening carried out Laminates of ROP screening guideline in IC and HDU rooms to ensure that every baby requiring ROP screen is identified in the first few days of life and the date written in the case notes and in the ROP diary Local ROP guidelines updated and current screening regimen is in line with national guidelines We have started a ROP audit on the unit covering the period Nov 2010 to Nov 2011 with a view to assessing our adherence to national guidance Discussions with ophthalmology service to ensure ophthalmologist available for ROP screen when required and ROP screen not carried out only when ophthalmologist available. Looking into buying a retinal scan so one of our medical staff could do the ROP screen and send the picture to ophthalmology to report on occasions when an ophthalmologist is not available. Funding has been sourced and discussions are ongoing with regards to the right equipment; this will require further training Development of an alert tool using the BadgerNet download to provide a weekly list of babies due ROP screening last week, this week and next week. This is taken on the ward round so that the right babies can be booked for screening at the right time
Admission of babies (gestations) to the NNU	
Babies being admitted who could have been kept with their mothers on the maternity ward – large numbers of term babies admitted	Transitional care formalised and will be identified on the system, which may reduce numbers of admissions >35 weeks gestation. Care of the baby at risk of developing hypoglycaemia guidance updated to help reduce these admissions External audit commissioned by Network addressing 34-35 week gestation admissions

Infection	
Levels of completion of blood culture data low	Weekly review of blood culture entries and results by consultant paediatrician, cross-referencing with microbiology lab entries Nursing staff to initiate completion of the episodic ad-hoc form when a baby has a blood culture taken; this then triggers a reminder under “things to do” on Badger enabling medical staff to complete the rest of the information Adopted CVC insertion bundle
Two-year follow up	
2-year follow up assessment forms for eligible babies not completed	Continue to run monthly 2 -year follow up clinics with monthly feedback A system has been devised to alert secretaries when the 2-year follow up are due 8 weeks in advance to that consultants in clinics can be alerted to fill in forms. Decision made to use detailed 2-year assessment being done for research projects in addition to the routine clinic assessments to improve 2-year outcome assessment rates Secretary in charge of Bayley 3 assessments to ring parents and remind them of appointments day prior
Collection of objective morbidity data not currently part of routine neonatal practice	System in place to identify babies who require 2-year follow up: i) parents informed re: need for follow-up at time of discharge from unit, ii) list of eligible babies coming up to 2 years corrected age in the next 2 months circulate to all consultants on a monthly basis to enable them to organise out-patient follow-up appointments, iii) reminder set on hospital ICS system for babies attending their 2 year follow-up appointments to serve as a reminder for OP clinic staff at the time of booking the patient in, who then remind the medical staff of the need to complete the Badger 2-year follow-up data at clinic consultation Intention for Bayley III to be undertaken by allied health professionals at 2 years in keeping with DOH toolkit principles, Network recommendations and for local data in annual reports – currently unsuccessful business case. Formal letter to Medical Director from Lead Neonatologist highlighting inability to provide this data to NNAP

The following units responded to the request for details of local action planning and improvements as a result of participation in the NNAP in 2011:

- Arrowe Park Hospital
- Barnsley District General Hospital
- Birmingham Heartlands Hospital
- Bradford Royal Infirmary
- Bedford Hospital Dewsbury and District Hospital
- Calderdale Royal Hospital
- Diana Princess of Wales Hospital
- Fairfield General Hospital
- Harrogate District Hospital
- Hereford County Hospital
- Hillingdon Hospital
- King's College Hospital
- Lancashire Women & Newborn Centre
- Leeds Neonatal Service
- Leighton Hospital
- Liverpool Women's Hospital
- Macclesfield District General Hospital
- Medway Maritime Hospital
- New Cross Hospital
- North Devon District Hospital
- North Manchester General Hospital
- Northampton General Hospital
- Peterborough City Hospital
- Pinderfields General Hospital
- Queen Alexandra Hospital, Portsmouth
- Queen Elizabeth Hospital, King's Lynn
- Queen Elizabeth Hospital, Woolwich
- Queen Elizabeth the Queen Mother Hospital, Margate
- Royal Devon and Exeter Hospital
- Royal Oldham Hospital
- Royal Sussex County Hospital
- Royal Victoria Infirmary
- St Helier Hospital
- St Mary's Hospital, Manchester
- Tameside Hospital
- The Royal Free
- University College Hospital
- University Hospital of North Staffordshire
- University Hospital of North Tees
- Watford General Hospital
- West Suffolk Hospital
- Wexham Park Hospital
- Worcestershire Royal Hospital
- York District Hospital

Appendix G: NNAP audit questions 2012

- 1) Do all babies of less than or equal to 28⁺⁶ weeks have their temperature taken within an hour after birth?
 - a) Of these temperatures taken within an hour of birth, the results would be banded into:
 - >37.5°C
 - 36.6°C to 37.5°C
 - 36°C to 36.5°C
 - 32°C to 35.9°C

and the numbers of babies less than or equal to 28⁺⁶ weeks falling into these categories reported.
- 2) Are all mothers who deliver their babies between 24⁺⁰ and 34⁺⁶ weeks gestation given any dose of antenatal steroids?
- 3) Are all babies <1501 g or a gestational age of <32⁺⁰ weeks at birth undergoing first ROP screening as per the current guideline recommendations?
- 4) What proportion of babies of <33⁺⁰ weeks gestation at birth are receiving any of their mother's milk when discharged from a neonatal unit?
- 5) Is there a documented consultation with parents by a senior member of the neonatal team within 24 hours of admission?"
- 6) Are all babies accessing neonatal services treated in their own Network (except where clinical reasons dictate)?
- 7) How many babies born between 32⁺⁰ to 36⁺⁶ weeks gestation and more than or equal to 37⁺⁰ weeks gestation receive transitional care (HRG4), special care on a neonatal unit (HRG3), high dependency care (HRG2) or intensive care (HRG1)?
- 8) Are rates of normal survival at 2 years comparable in similar babies in similar units? (*in 2012 we are auditing babies of <30⁺⁰ gestation at birth*)
- 9) What percentage of babies admitted to a neonatal unit have:
 - a) one or more episodes of a pure growth of a pathogen from blood
 - b) one or more episodes of a pure growth of a pathogen from CSF
 - c) either a pure growth of a skin commensal or a mixed growth with ≥ 3 clinical signs at the time of blood sampling

What percentage of babies of more than or equal to 35⁺⁰ weeks gestation have an encephalopathy within the first 3 calendar days of birth?

The definition will be based upon a combination of the findings for tone, consciousness and seizures.

- 11) How many blood stream infections^a are there on a NNU per 1000 days of central line^b care?

^a The growth of a recognised pathogen in pure culture, or in the case of a mixed growth, or growth of skin commensal, the added requirement for 3 or more of 10 predefined clinical signs

^b central line = UAC, UVC, percutaneous long line or surgically inserted long line.



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